WIPER AND WASHER SYSTEM

PRECAUTION

1. GENERAL PRECAUTION

(a) While using the battery during inspection, do not bring the positive and negative tester probes too close to each other as a short circuit may occur.

2. PRECAUTION FOR DISCONNECTING THE BATTERY CABLE

NOTICE:

When disconnecting the battery cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

System Name	See procedure
Power Window Control System	IN-29
Sliding Roof System	IN-29

3. EXPRESSIONS OF IGNITION SWITCH

(a) The type of ignition switch used on this model differs according to the specifications of the vehicle.
The expressions listed in the table below are used in this section.

Switch Type		Ignition Switch (position)	Engine Switch (condition)
Expression	Ignition Switch off	LOCK	Off
	Ignition Switch on (IG)	ON	On (IG)
	Ignition Switch on (ACC)	ACC	On (ACC)
	Engine Start	START	Start

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
The intelligent tester can be used in steps 5, 6 and 12.

1	VEHICLE BROUGHT TO WORKSHOP

NEXT

2	CUSTOMER PROBLEM ANALYSIS

(a) Confirm problem symptoms.
HINT:
See page IN-36.

NEXT

3	PROBLEM SYMPTOM CONFIRMATION

- SYMPTOM DOES NOT OCCUR (GO TO STEP 4)
- SYMPTOM OCCURS (GO TO STEP 5)

4	SYMPTOM SIMULATION

NEXT

5	CHECK BODY MULTIPLEX COMMUNICATION SYSTEM

(a) Check that the DTC is output.

- MULTIPLEX DTC OUTPUTS (PROCEED TO "BODY MULTIPLEX COMMUNICATION SYSTEM")
- NO MULTIPLEX DTC (GO TO STEP 6)

6	CHECK CAN COMMUNICATION SYSTEM

(a) Check that the DTC is output.

- CAN DTC OUTPUTS (PROCEED TO "CAN COMMUNICATION SYSTEM")
- NO CAN DTC (GO TO STEP7)

7	**PROBLEM SYMPTOMS TABLE**

NEXT

8	**CIRCUIT INSPECTION**

NEXT

9	**TERMINALS OF ECU**

NEXT

10	**IDENTIFICATION OF PROBLEM**

NEXT

11	**REPAIR OR REPLACE**

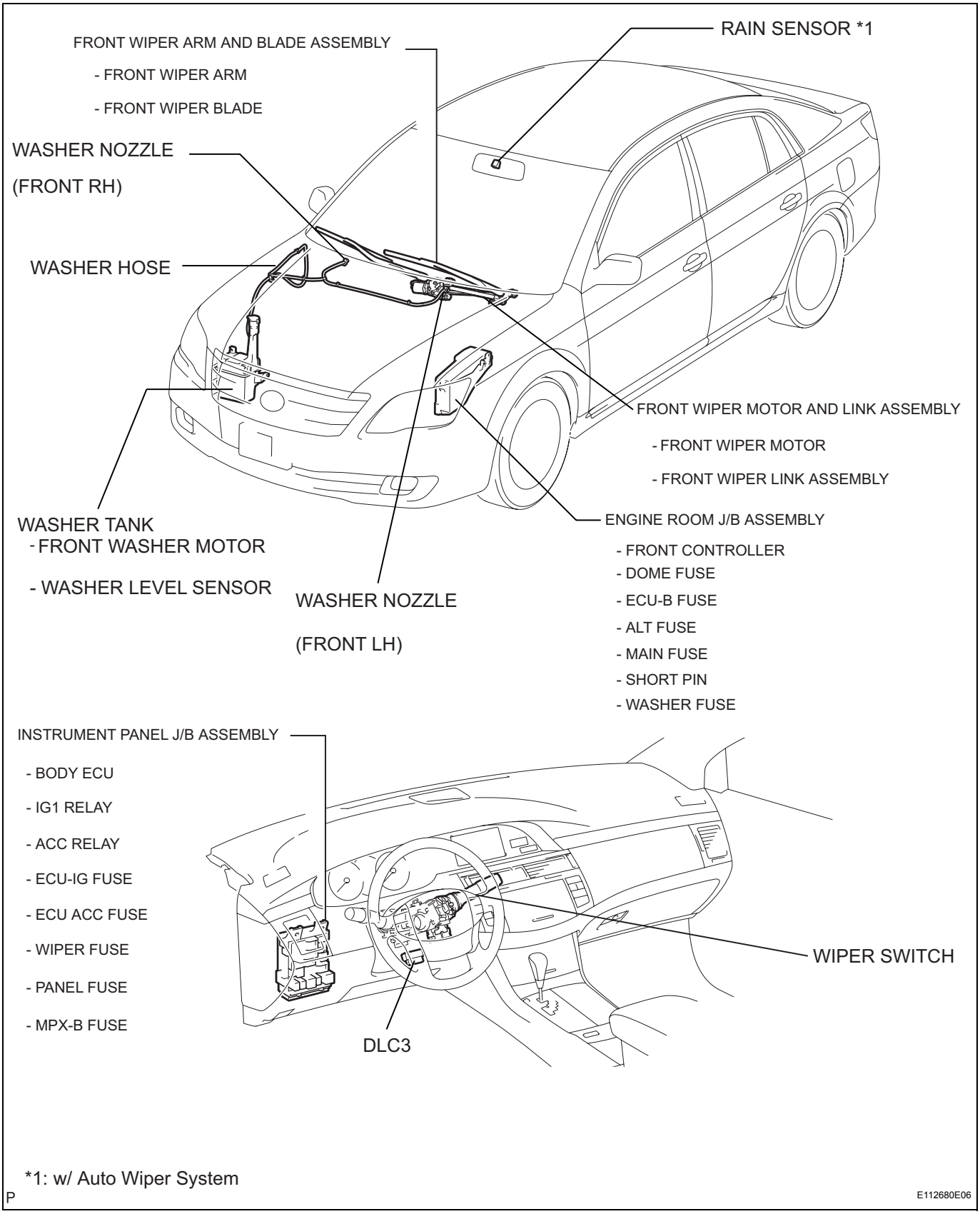
NEXT

12	**CONFIRMATION TEST**

NEXT

END

PARTS LOCATION



*1: w/ Auto Wiper System

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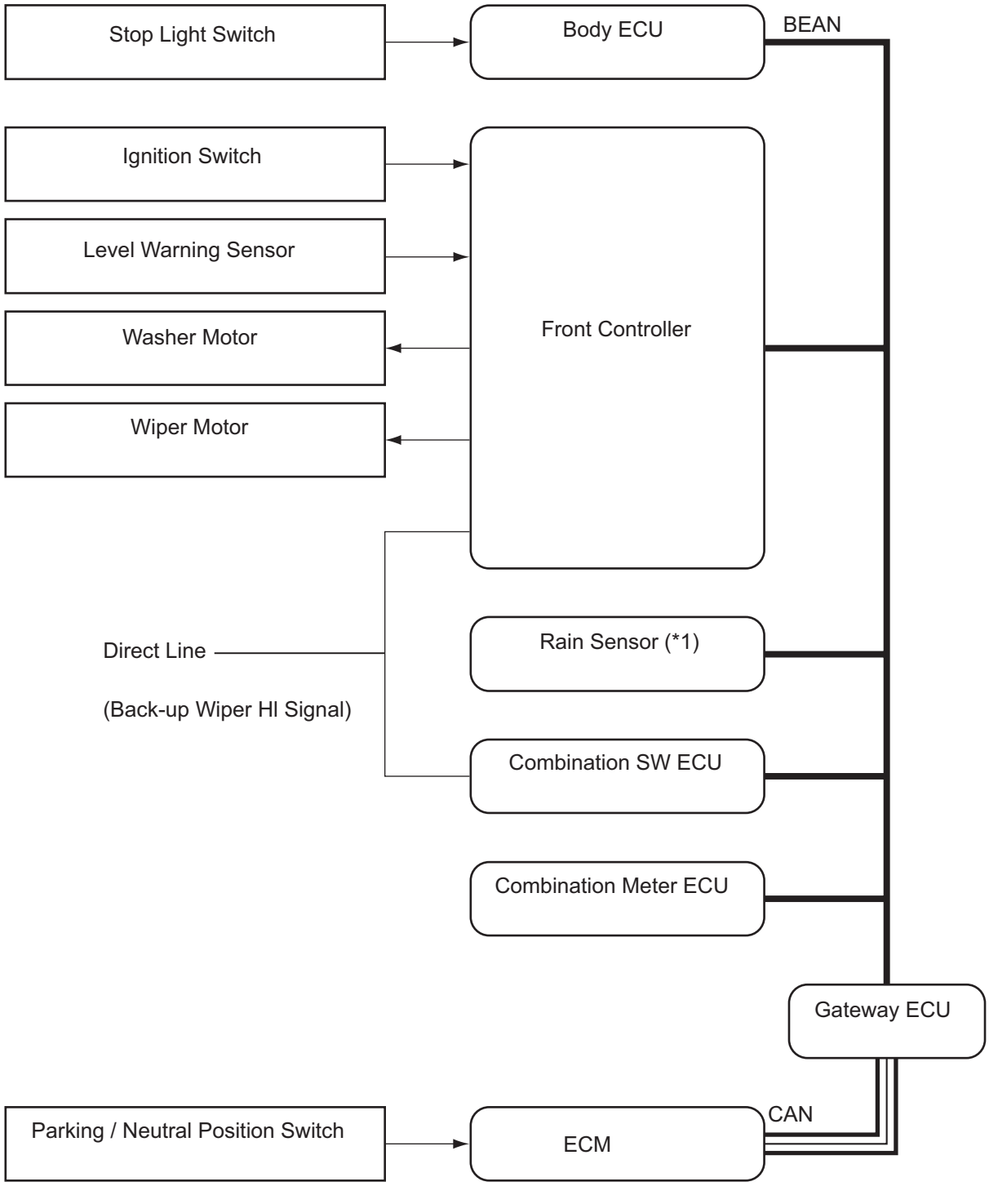
SYSTEM DIAGRAM



Input and output signal of each ECU

Transmitting ECU (Transmitter)	Receiving ECU	Signals	Communication method
Rain Sensor	Front Controller	• HI continuous operation command signal • LO continuous operation command signal • LO signal operation command signal • Manual intermittent operation command signal	BEAN
Combination Switch ECU	Front Controller	• Wiper SW INT signal • Wiper SW LO signal • Wiper SW HI signal • Wiper SW AUTO position signal • Washer SW signal • Wiper SW MIST signal • Wiper adjusting volume signal	BEAN
Combination Meter ECU	Front Controller	Vehicle speed signal	BEAN
Combination Meter ECU	Rain sensor	Vehicle speed signal	BEAN
Combination Switch ECU	Rain sensor	Wiper & washer SW signal	BEAN
ECM	Front Controller	• Shift position P signal • Shift position N signal	CAN-BEAN
Body ECU	Front Controller	Stop light ON command signal	BEAN
Body ECU	Combination Switch ECU	Ignition SW signal	BEAN
Body ECU	Rain sensor	Display dimmer signal	BEAN
Front Controller	Rain sensor	Wiper motor position signal	BEAN
Front Controller	Combination Meter ECU	Washer level signal	BEAN

HINT:
Wiper operation is controlled, in principle, by the front controller.
The rain sensor, however, controls the auto wiper function.

SYSTEM DESCRIPTION

1. FRONT WIPER SYSTEM

(a) When the front wiper system receives a wiper operation signal from the combination switch ECU, the front controller operates the wiper motor.

(b) While the wipers are operating in intermittent mode from directions from the combination switch, the front controller adjusts the interval between movements of the wiper arm, according to vehicle speed, brake signals, and driving and stopping conditions. The system has the following functions:

Function	Outline
Vehicle speed sensing intermittent wiper function (*1)	This function controls the intermittent interval of the wipers according to the vehicle speed when the wiper switch is in the INT position.
Vehicle speed switching function	This function automatically switches the wipers on or off when the vehicle is stopped or starts moving when the wiper switch is in the LO position.

*1: The vehicle speed sensing intermittent wiper function operates when the fail safe function is operating if there is a malfunction in the auto-wiper function.

2. FRONT WASHER SYSTEM

(a) When the front washer system receives a wiper operation signal from the combination switch ECU, the front controller operates the washer motor.

3. CONTINUOUS FRONT WASHER WIPER SYSTEM

(a) When the continuous front washer system receives a washer operation signal from the combination switch ECU, the front controller operates the wiper motor. The front wiper arms continue operation for 3 times after the front washer is stopped.

(b) The front wipers stop operating 3 times after the front washer switch has been ON for more than 40 seconds continuously. The front wipers then operates once at an interval of 3 to 7 seconds. The interval is determined by the vehicle speed signal received from the combination meter.

4. AUTOMATIC WIPER SYSTEM

(a) In the automatic wiper system, the rain sensor mounted in the upper portion of the windshield sends a front wiper operation command, according to the amount of rainfall, to the front controller. The front wipers operate when the windshield wiper switch is in the AUTO position. The rain sensor sensitivity can be adjusted by the windshield wiper switch's adjusting volume.

(b) In this system, when the front controller receives a vehicle speed signal from the combination meter, and operates the front wipers according to the vehicle speed.

(c) While the wiper motor is operating intermittently from directions from the rain sensor, the front controller adjusts the interval only in auto mode between movements of the wiper arm, according to vehicle speed, brake signals, and driving and stopping conditions.

CUSTOMIZE PARAMETERS

HINT:
The following items can be customized.

NOTICE:

- **After confirming whether the items of the customer's request can be customized or not, perform the customize operation.**
- **Be sure to record the current settings before customizing.**
- **In case of troubleshooting, pay attention as there is a possibility that the function is set to OFF by customizing. (Example: In case of the symptom in which the wireless operation does not function, check that the wireless operation is not set to OFF by customizing, then perform the troubleshooting.)**

WIPER

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
AUTO WIPE (Auto wipe)	AVAIL	Function to operate the wiper automatically when it is raining.	NOT AVAIL / AVAIL
REWIPE CONTROL (Rewipe Control)	SPD MOD	Function to change the time between end of the washer motor operation and start of wiper operation, to prevent streaking from washer fluid.	OFF / 3s / SPD MOD
SPEED MODE (Speed Mode)	AVAIL	Function to change to the intermittent operation mode when the vehicle comes to a stop (0 vehicle speed) from a driving condition where the wiper switch is in the LO position.	NOT AVAIL / AVAIL

PROBLEM SYMPTOMS TABLE

HINT:

- Proceed to troubleshooting of each circuit in the tables below.
- Inspect the fuse and relay before confirming the suspected area as shown in the tables below.
  Inspect each malfunction circuit in numerical order for the corresponding symptom.
  If the malfunction still exists after checking and confirming that all the circuits are normal, replace the ECU.

1. WIPER AND WASHER SYSTEM

Symptom	Suspected area	See page
Wiper and washer system does not operate at all	1. Combination switch ECU power source circuit	WW-13
	2. Wiper and washer switch circuit	WW-24
	3. Front controller	-
Wiper system does not operate (LO, INT)	1. Wiper and washer switch circuit	WW-24
	2. Wiper motor circuit	WW-16
	3. Front controller	-
Wiper system does not operate (HI)	1. Wiper switch (HI speed) circuit	WW-22
	2. Wiper motor circuit	WW-16
	3. Front controller	-
Washer system does not operate	1. Wiper and washer switch circuit	WW-24
	2. Washer motor circuit	WW-29
	3. Front controller	-
Washer fluid level warning system does not operate	1. Washer fluid level warning switch circuit	WW-34
	2. Front controller	-

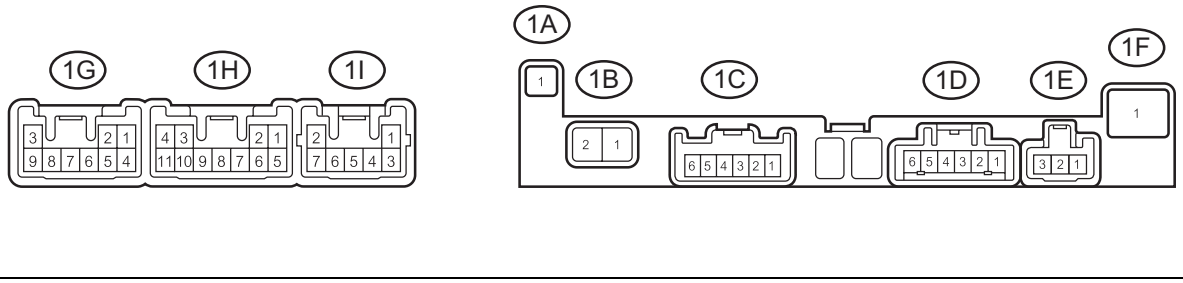
2. AUTO WIPER SYSTEM

Symptom	Suspected area	See page
Auto wiper system does not operate (manual operation is normal)	1. Rain sensor circuit	WW-25
	2. Rain sensor	-
	3. Front controller	-

TERMINALS OF ECU

1. FRONT CONTROLLER

Engine Room J/B (Front Controller)

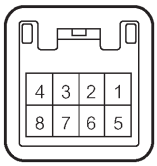


Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
1A-1 - 1H-8	B - W-B	Power source circuit	Always	10 to 14 V
1B-1 - 1H-8	Y - W-B	Front washer motor circuit (To washer motor)	Front washer switch OFF	Below 1 V
1B-1 - 1H-8	Y - W-B	Front washer motor circuit (To washer motor)	Front washer switch ON	10 to 14 V
1D-1 - 1H-8	P - W-B	Front wiper motor circuit (HI operation signal)	Wiper switch in HI	10 to 14 V
1D-1 - 1H-8	P - W-B	Front wiper motor circuit (HI operation signal)	Wiper switch in a position except HI	Below 1 V
1D-2 - 1H-8	R - W-B	Front wiper motor circuit (LO operation signal)	Wiper switch in LOW	10 to 14 V
1D-2 - 1H-8	R - W-B	Front wiper motor circuit (LO operation signal)	Wiper switch in a position except LOW	Below 1 V
1E-1 - 1H-8	LG - W-B	Power source circuit	Always	10 to 14 V
1E-3 - 1H-8	B - W-B	Front wiper motor circuit (Operation signal)	Wiper switch OFF	Below 1 V
1E-3 - 1H-8	B - W-B	Front wiper motor circuit (Operation signal)	Wiper switch in HI or LOW	10 to 14 V
1F-1 - 1H-8	B - W-B	Power source circuit	Always	10 to 14 V (*1)
1F-1 - 1H-8	W - W-B	Power source circuit	Always	10 to 14 V (*2)
IG-4 - 1H-8	L - W-B	Wiper switch HI signal	Wiper switch OFF	Below 1 V
IG-4 - 1H-8	L - W-B	Wiper switch HI signal	Wiper switch in HI	10 to 14 V
1G-7 - Body ground	Y - Body ground	Multiplex communication signal circuit	Ignition switch on (IG)	Signal waveform
1G-8 - Body ground	B - Body ground	Multiplex communication signal circuit	Ignition switch on (IG)	Signal waveform
1H-2 - Body ground	W-B - Body ground	Ground	Always	Below 1 V
1H-8 - Body ground	W-B - Body ground	Ground	Always	Below 1 V
1I-2 - 1H-8	LG - W-B	Washer level sensor circuit	Ignition switch on (IG) and washer jar is full	Below 1 V
1I-2 - 1H-8	LG - W-B	Washer level sensor circuit	Ignition switch on (IG) and Washer jar is empty	10 to 14 V

*1: w/: Smart Key System
*2: w/o: Smart Key System

2. COMBINATION SWITCH ECU

Windshield Wiper Switch (Combination Switch ECU):



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Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
B (D13-1) - E (D13-5)	W - W-B	Power source circuit	Always	10 to 14 V
IG (D13-2) - E (D13-5)	L - W-B	Ignition switch signal circuit	Ignition switch off	Below 1 V
IG (D13-2) - E (D13-5)	L - W-B	Ignition switch signal circuit	Ignition switch on (IG)	10 to 14 V
2S (D13-3) - E (DB-5)	G - W-B	Wiper switch (HI) signal circuit	Front wiper switch off	Below 1 V
2S (D13-3) - E (DB-5)	G - W-B	Wiper switch (HI) signal circuit	Front wiper switch in HI	10 to 14 V
E (D13-5) - Body ground	W-B - Body ground	Ground circuit	Always	Below 1 V
MPX1 (D13-6) - Body ground	BR - Body ground	Multiplex communication signal circuit	Ignition switch on (IG)	Signal waveform
MPX2 (D13-7) - Body ground	R - Body ground	Multiplex communication signal circuit	Ignition switch on (IG)	Signal waveform (*1)
MPX2 (D13-7) - Body ground	B - Body ground	Multiplex communication signal circuit	Ignition switch on (IG)	Signal waveform (*2)

*1: w/: Smart Key System
*2: w/o: Smart Key System

FAIL-SAFE CHART

1. FRONT WIPER SYSTEM

(a) When the wiper switch is in any position other than "OFF" and the blades have been frozen, a malfunction is detected by the front controller and the wiper operation stops.
HINT:
Recovery condition: Ignition switch off.

(b) When the rain sensor is broken and the wiper switch is in the AUTO position, change the front wiper system to the intermittent mode.
HINT:
Recovery condition: Signal level error cancellation from rain sensor.

(c) When the rain sensor overheats and the front wiper is in the HI operation mode, change the front wiper system to the LO operation mode.
HINT:
Recovery condition: Ignition switch off or wiper operation signal indicates a mode except INT and LO.

(d) When the front controller malfunctions, the front wiper system is in the HI operation mode by combination switch only.
HINT:
Recovery condition: Front controller returns to normal.

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the DATA LIST displayed on the intelligent tester, you can read the values of the switches, sensors, actuators, etc. without removing any parts. Reading the DATA LIST as the first step in troubleshooting is one of the methods to shorten labor time.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on (IG).
(c) According to the display on the tester, read the "DATA LIST".

BODY NO.5 (FRONT CONTROLLER):

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
SPEED MODE	Speed mode / NOT AVL or AVAIL	Customized value can be displayed	-
AUTO WIPER	Auto wiper / NOT AVL or AVAIL	Customized value can be displayed	-
REWIPE CONTROL	Rewipe control / OFF or 3S or SPD	Customized value can be displayed	-
WASHER LVL SW	Washer level switch / ON or OFF	ON: Washer jar is empty OFF: Washer jar is full	-
FRONT WIPER SW	Front wiper switch / ON or OFF	ON: Front wiper switch in a position except OFF OFF: Front wiper switch OFF	-

COMBINATION SWITCH ECU (WINDSHIELD WIPER SWITCH ASSEMBLY):

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
F WASHER SW	Washer switch / ON or OFF	ON: Washer switch ON OFF: Washer switch OFF	-
F WIPER MIST SW	Front wiper MIST switch / ON or OFF	ON: Front wiper switch in MIST position OFF: Front wiper switch in a position except MIST	-
F WIPER HI SW	Front wiper HI switch / ON or OFF	ON: Front wiper switch in HI position OFF: Front wiper switch in a position except HI	-
F WIPER LO SW	Front wiper LO switch / ON or OFF	ON: Front wiper switch in LO position OFF: Front wiper switch in a position except LO	-
F WIPER INT SW	Front wiper INT switch / ON or OFF	ON: Front wiper switch in INT position OFF: Front wiper switch in a position except INT	-
IG SW SIG	IG switch signal / ON or OFF	ON: Ignition switch on (IG) OFF: Ignition switch off	-
F WIPER VOL POS	Wiper volume position / min=00 - max=90	Customized value can be displayed	-

RAIN SENSOR:

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
WIPER SW LO SIG	Front wiper switch LO signal / ON or OFF	ON: Front wiper switch in LO position OFF: Front wiper switch in a position except LO	-
WIPER SW HI SIG	Front wiper switch HI signal / ON or OFF	ON: Front wiper switch in HI position OFF: Front wiper switch in a position except HI	-
WIPER SW AUTO SIG	Front wiper switch AUTO signal / ON or OFF	ON: Front wiper switch in HI position OFF: Front wiper switch in a position except HI	-
WASHER SW SIG	Washer switch signal / ON or OFF	ON: Washer switch ON OFF: Washer switch OFF	-
F WIPER HI SW	Front wiper HI switch / ON or OFF	ON: Front wiper switch in HI position OFF: Front wiper switch in a position except HI	-

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
F WIPER LO SW	Front wiper LO switch / ON or OFF	ON: Front wiper switch in LO position OFF: Front wiper switch in a position except LO	-

2. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the intelligent tester allows the relays, actuators, etc. to operate without removing any parts. Performing the ACTIVE TEST as the first step of troubleshooting is one of the methods to shorten labor time. The DATA LIST can be displayed during the ACTIVE TEST.

(a) Connect the intelligent tester to the DLC3.

(b) Turn the ignition switch on (IG).

(c) According to the display on the tester, perform the "ACTIVE TEST".

WW

BODY NO.5 (FRONT CONTROLLER):

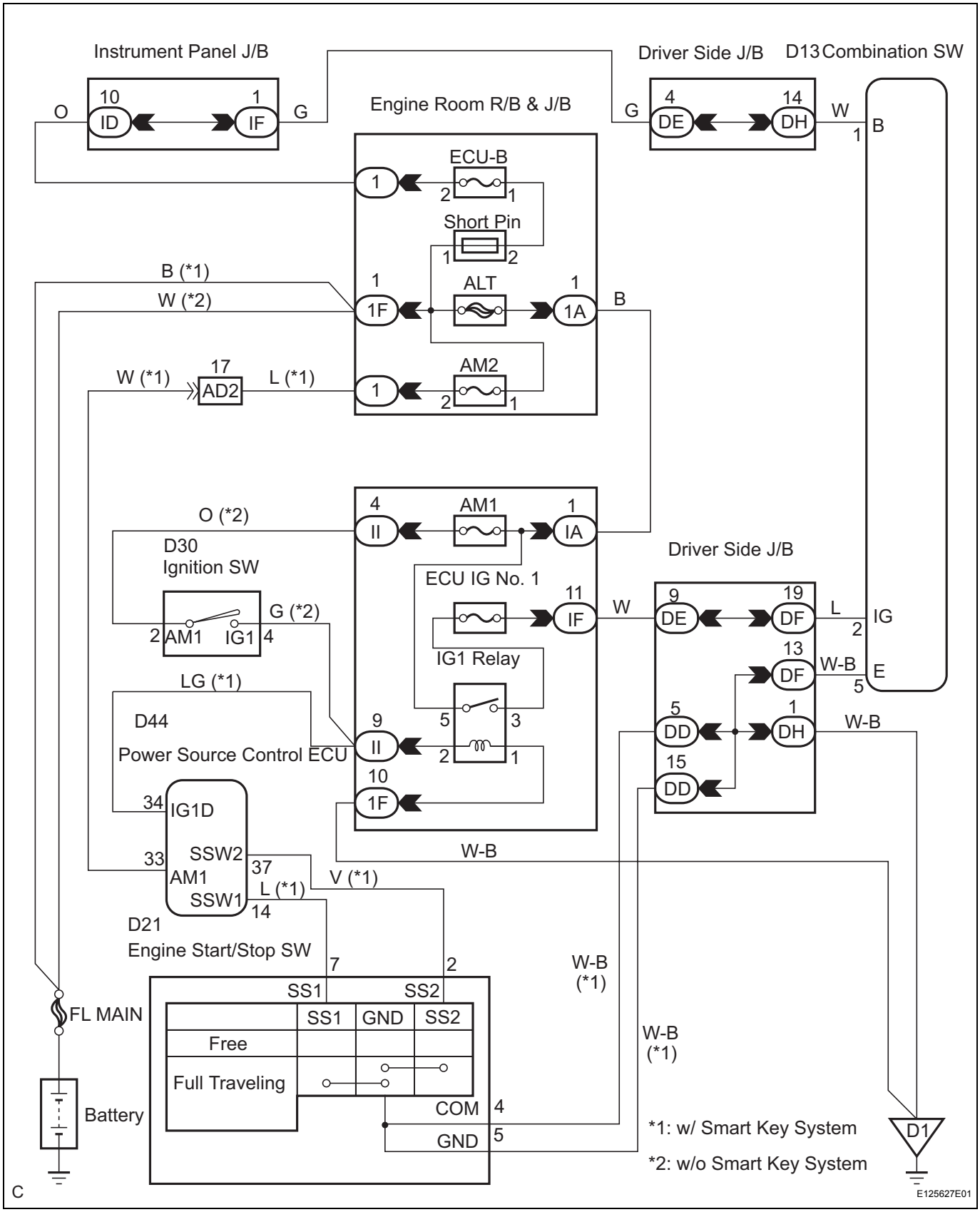
Item	Test Details	Diagnostic Note
WIPER MOT (HI)	Wiper motor HI operation ON / OFF	-
WIPER MOT (LO)	Wiper motor LO operation ON / OFF	-
WASHER MOTOR	Washer motor operation ON / OFF	-

Combination Switch ECU Power Source Circuit

DESCRIPTION

This circuit provides power to the combination switch.

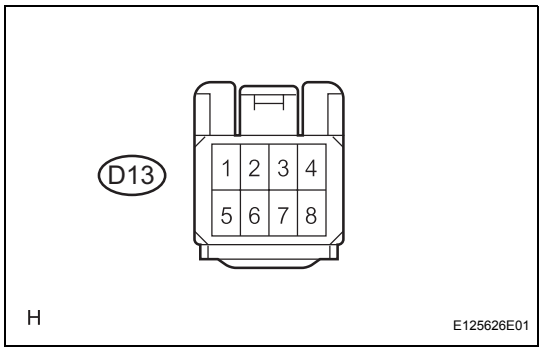
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Before performing this procedure, check that DTCs for the multiplex communication system are not output (See page MP-23).

1 CHECK HARNESS AND CONNECTOR (BATTERY - COMBINATION SWITCH)



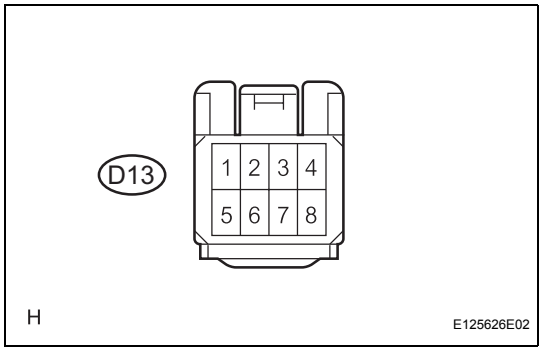
(a) Disconnect the connector from the combination switch ECU.
(b) Measure the voltage according to the value(s) in the table below.
Voltage

Tester connection	Condition	Specified Condition
D13-1 - Body ground	Always	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 CHECK HARNESS AND CONNECTOR (IGNITION SWITCH CIRCUIT)



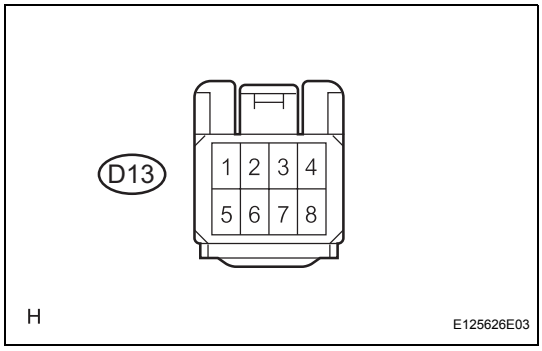
(a) Measure the voltage according to the value(s) in the table below.
Voltage

Tester connection	Condition	Specified Condition
D13-2 - Body ground	Ignition switch on (IG)	10 to 14 V
D13-2 - Body ground	Ignition switch off	Below 1 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3 CHECK HARNESS AND CONNECTOR (COMBINATION SWITCH - BODY GROUND)



(a) Measure the resistance according to the value(s) in the table below.
Voltage

Tester connection	Condition	Specified Condition
D13-5 - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

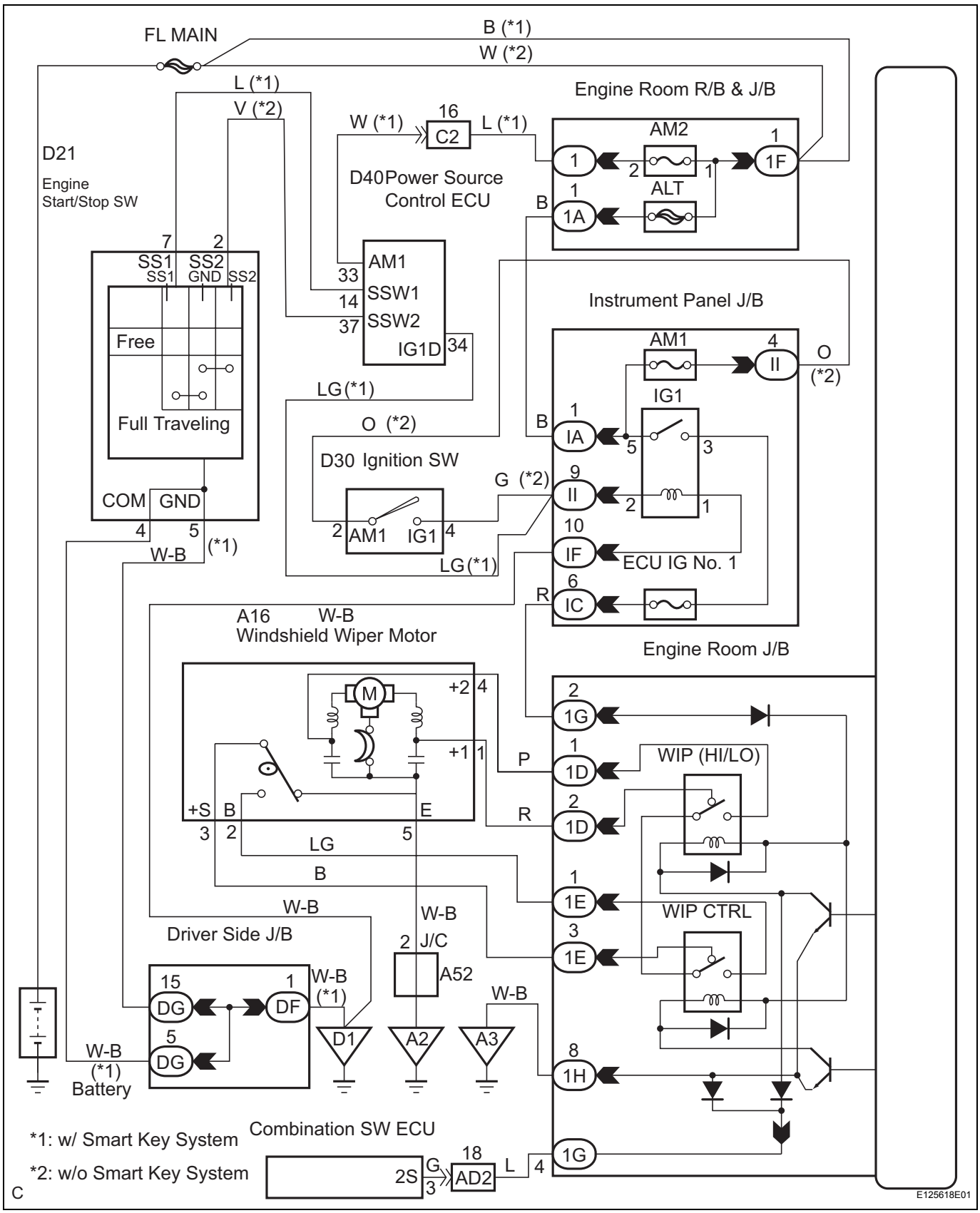
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

Front Wiper Motor Circuit

DESCRIPTION

The front controller controls the wiper motor. Even if the ECU is malfunctioning, the wiper motor circuit is designed so that the wipers can still function in HI mode.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	PERFORM ACTIVE TEST BY INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on (IG) and turn the intelligent tester main switch on.
(c) Select the item below in the ACTIVE TEST and then check that the wiper motor operates.

BODY NO.5 (FRONT CONTROLLER):

Item	Test Details	Diagnostic Note
WIPER MOT (HI)	Wiper motor HI operation ON / OFF	-
WIPER MOT (LO)	Wiper motor LO operation ON / OFF	-

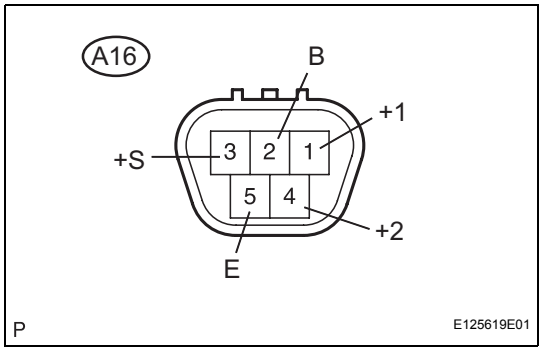
OK:
Wiper motor operates in HI or LO mode depending on command.

NG → **Go to step 2**

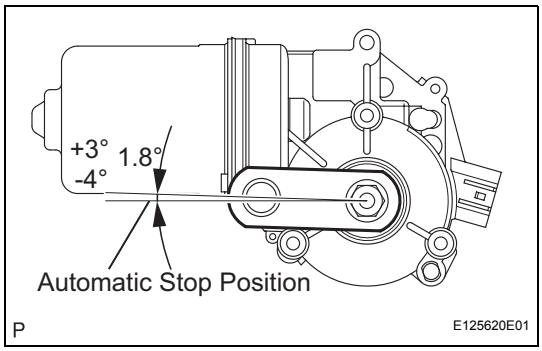
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

2	INSPECT WINDSHIELD WIPER MOTOR ASSEMBLY



(a) Remove the windshield wiper motor assembly (See page WW-37).
(b) LO operation check.
(1) Connect the positive battery (+) lead to terminal 1 (+1) of the connector, and the negative battery (-) lead to terminal 5 (E).
OK:
Motor is operated at low speed.
(c) HI operation check.
(1) Connect the positive battery (+) lead to terminal 4 (+2) of the connector, and the negative battery (-) lead to terminal 5 (E).
OK:
Motor is operated at high speed.
(d) Automatic stop operation check.
(1) Connect the positive battery (+) lead to terminal 1 (+1) of the connector, and the negative battery (-) lead to terminal 5 (E). With the motor operating at low speed, disconnect terminal 1 (+1) to stop wiper motor operation where in any position other than the automatic stop position.
(2) Using SST, connect terminals 3 (+S) and 1 (+1), and the positive battery (+) lead to terminal 2 (B) to restart motor operation at low speed.



(3) Check that the motor stops at the automatic stop position.
OK:
Motor stops as shown in the illustration.

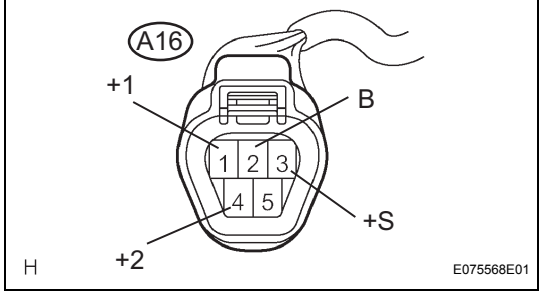
NG → **REPLACE WINDSHIELD WIPER MOTOR ASSEMBLY**

OK

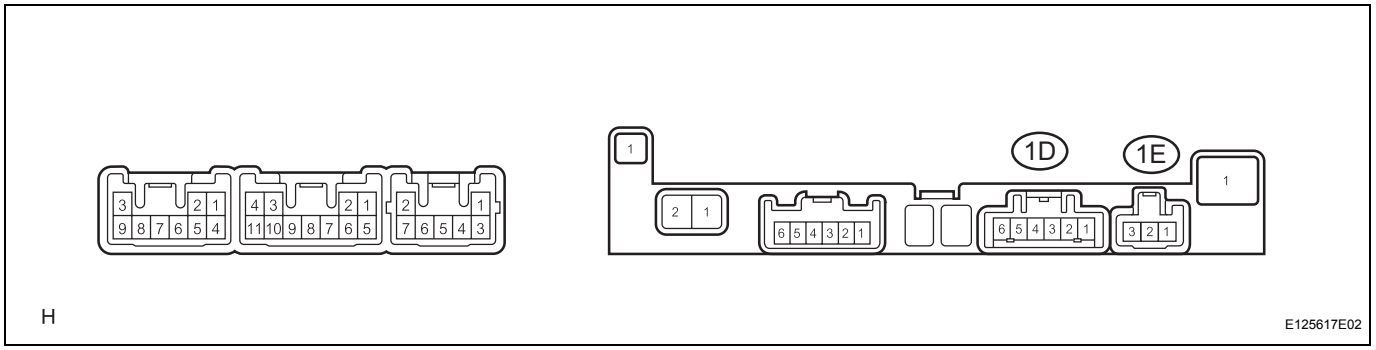
WW

3	CHECK HARNESS AND CONNECTOR (WINDSHIELD WIPER MOTOR ASSEMBLY - FRONT CONTROLLER)

Wire Harness View:



(a) Disconnect the A16 wiper motor connector.
(b) Disconnect the 1D and 1E connectors from the front controller.



(c) Measure the resistance according to the value(s) in the table below.

Resistance

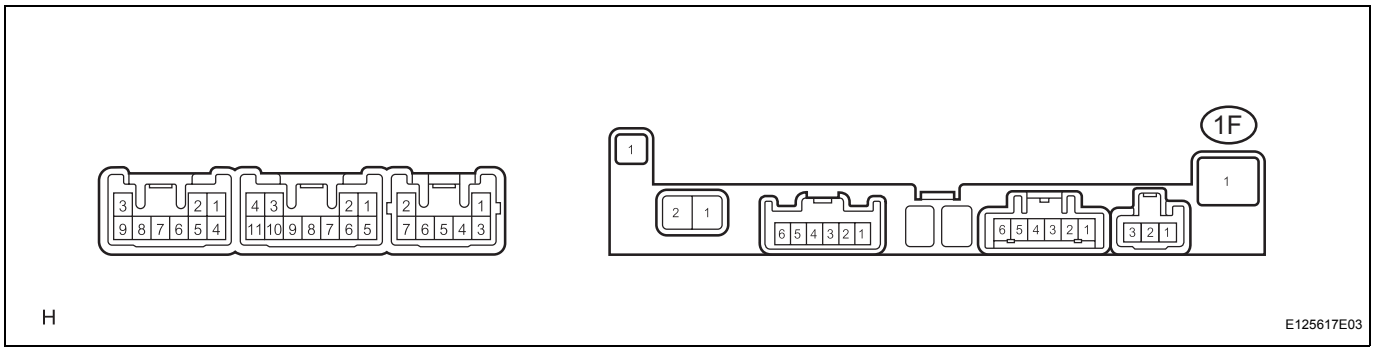
Tester Connection	Condition	Specified Condition
A16-1 - 1D-2	Always	Below 1 Ω
A16-2 - 1E-1	Always	Below 1 Ω
A16-3 - 1E-3	Always	Below 1 Ω
A16-4 - 1D-1	Always	Below 1 Ω
A16-1 - Body ground	Always	10 kΩ or higher
A16-2 - Body ground	Always	10 kΩ or higher
A16-3 - Body ground	Always	10 kΩ or higher
A16-4 - Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4	CHECK HARNESS AND CONNECTOR (BATTERY - FRONT CONTROLLER)

(a) Measure the voltage according to the value(s) in the table below.



Voltage

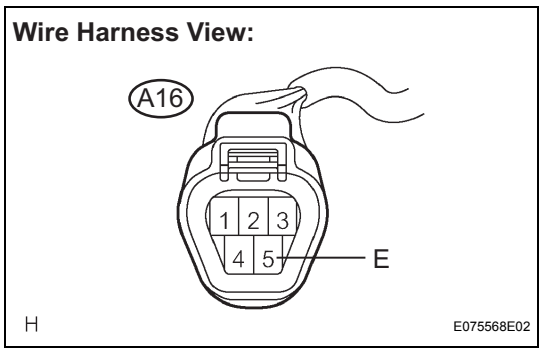
Tester Connection	Condition	Specified Condition
1F-1 - Body ground	Always	10 to 14 V

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5	CHECK HARNESS AND CONNECTOR (WINDSHIELD WIPER MOTOR ASSEMBLY - BODY GROUND)

Wire Harness View:



(a) Disconnect the A16 wiper motor connector.
(b) Measure the resistance according to the value(s) in the table below.

Resistance

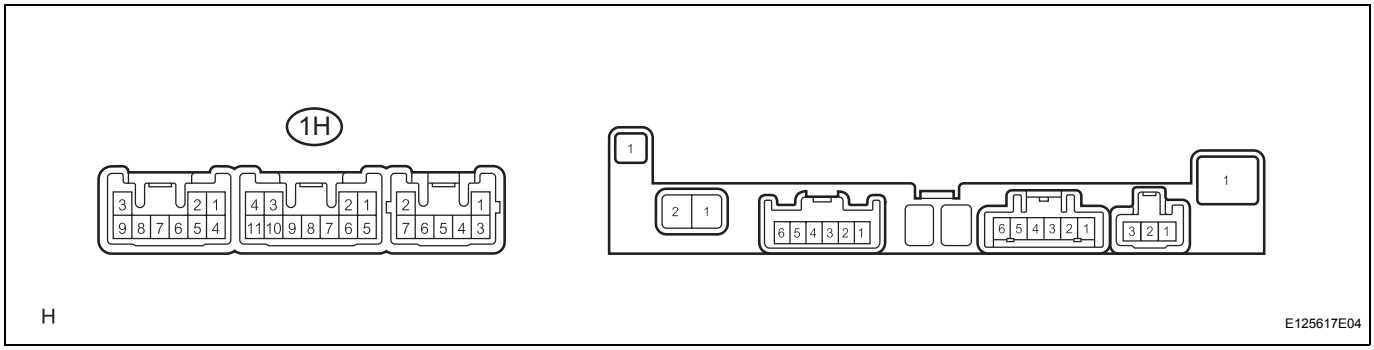
Tester Connection	Condition	Specified Condition
A16-5 - Body ground	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6	CHECK HARNESS AND CONNECTOR (FRONT CONTROLLER - BODY GROUND)

(a) Disconnect the 1H connector from the front controller.



(b) Measure the resistance according to the value(s) in the table below:

Resistance

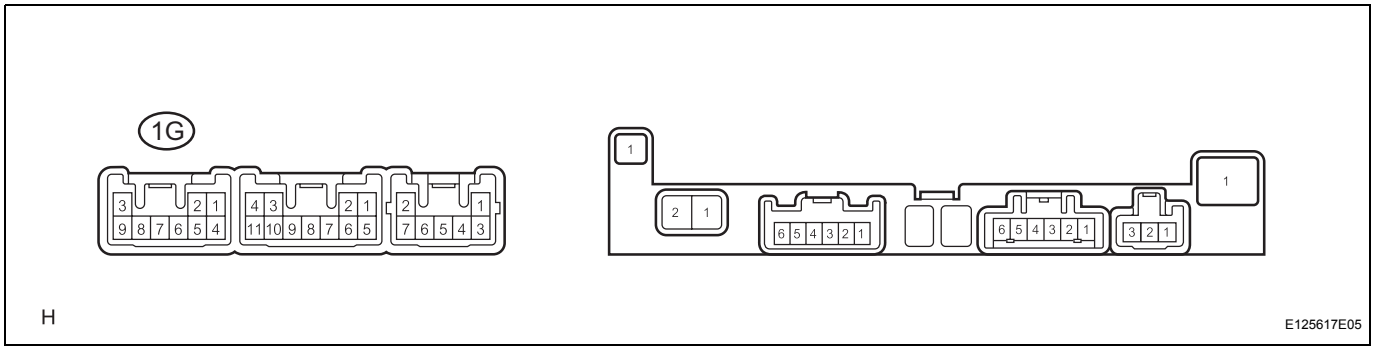
Tester Connection	Condition	Specified Condition
1H-8 - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

7	CHECK HARNESS AND CONNECTOR (IGNITION SWITCH CIRCUIT)

(a) Disconnect the 1G connector from the front controller.



(b) Measure the voltage according to the value(s) in the table below:

Voltage

Tester Connection	Condition	Specified Condition
1G-2 - Body ground	Ignition switch off	Below 1 V
1G-2 - Body ground	Ignition switch on (IG)	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

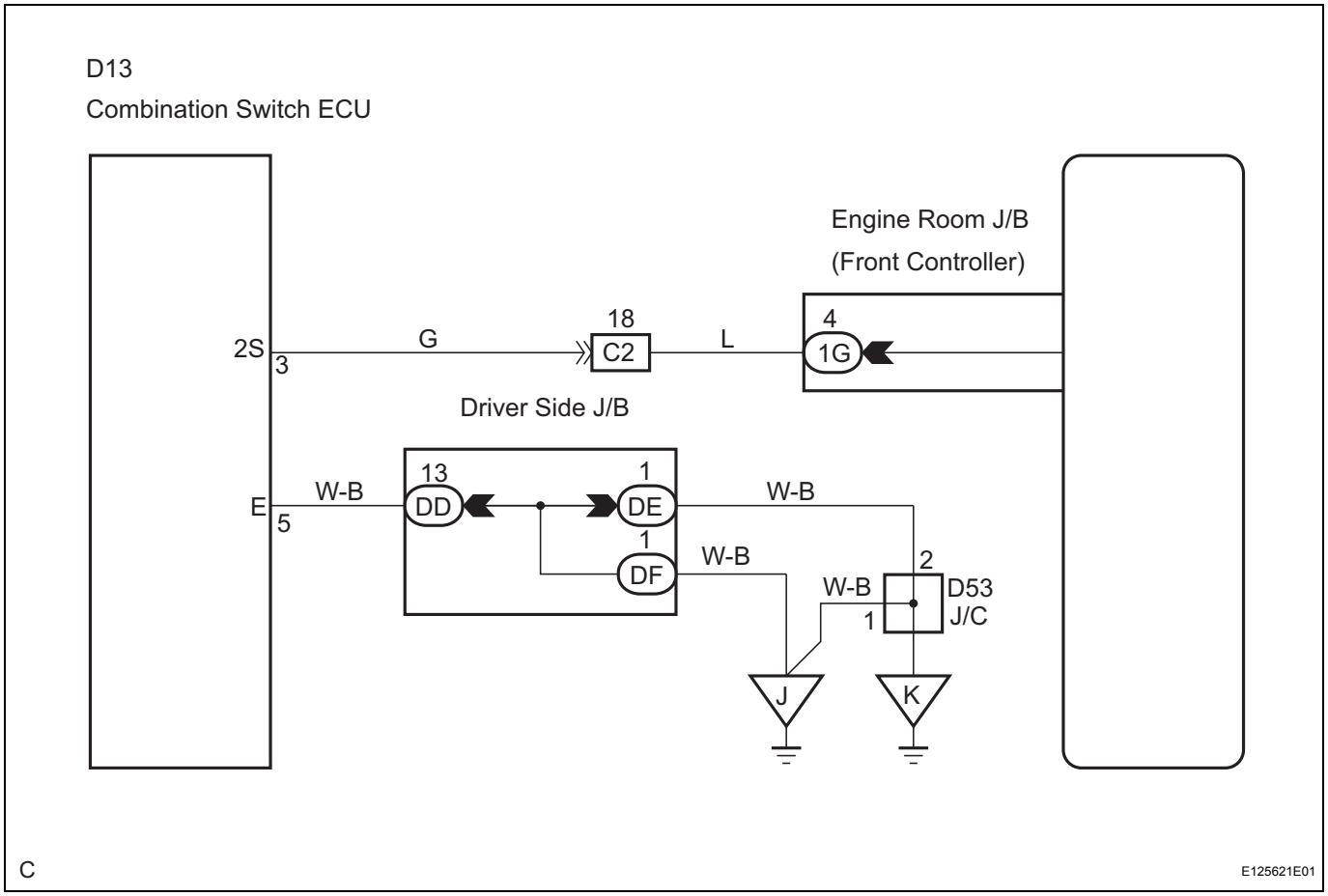
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

Wiper Switch (HI Speed) Circuit

DESCRIPTION

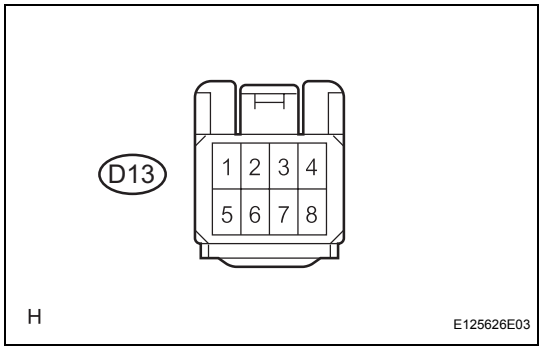
The front controller receives a HI position signal from the wiper switch to operate the wiper motor at high speed.
Even if the ECU malfunctions, its circuit structure enables it to operate the wiper in HI operation mode.

WIRING DIAGRAM

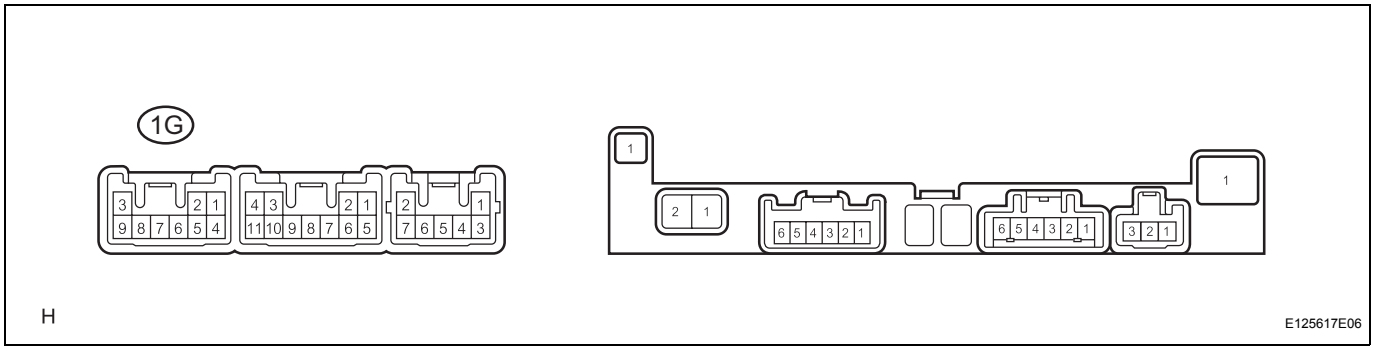


INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR (COMBINATION SWITCH ECU - FRONT CONTROLLER)



(a) Disconnect the combination switch ECU connector.
(b) Disconnect the 1G connector from the front controller.



(c) Measure the resistance according to the value(s) in the table below.

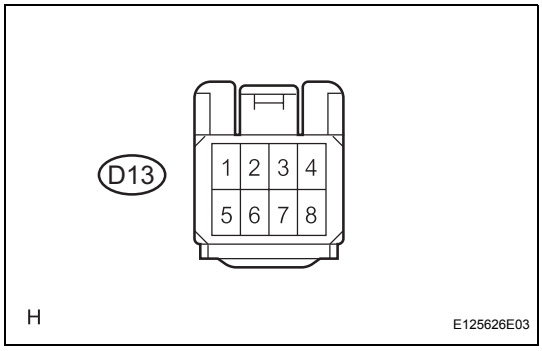
Resistance

Tester Connection	Condition	Specified Condition
D13-3 - 1G-4	Always	Below 1 Ω
1G-4 - Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 CHECK HARNESS AND CONNECTOR (COMBINATION SWITCH ECU - BODY GROUND)



(a) Disconnect the combination switch ECU connector.
(b) Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Condition	Specified Condition
D13-5 - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

Wiper and Washer Switch Circuit

DESCRIPTION

The signals output by manual operation are sent to the front controller.

INSPECTION PROCEDURE

HINT:
Before performing this procedure, check that DTCs for the multiplex communication system are not output (See page MP-23).

1	READ VALUE OF INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on (IG) and turn the intelligent tester main switch on.
(c) Select the items below in the DATA LIST, and read the displays on the intelligent tester.

WW

COMBINATION SWITCH ECU:

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
F WASHER SW	Front washer switch / ON or OFF	ON: Front washer switch ON OFF: Front washer switch OFF	-
F WIPER MIST SW	Front wiper MIST switch / ON or OFF	ON: Front wiper switch in MIST OFF: Wiper switch in a position except MIST	-
F WIPER HI SW	Front wiper HI switch / ON or OFF	ON: Front wiper switch in HI OFF: Wiper switch in a position except HI	-
F WIPER LO SW	Front wiper LO switch / ON or OFF	ON: Front wiper switch in LO OFF: Wiper switch in a position except LO	-
F WIPER INT SW	Front wiper INT switch / ON or OFF	ON: Front wiper switch in INT OFF: Wiper switch in a position except INT	-
IG SW SIG	IG switch signal / ON or OFF	ON: Ignition switch on (IG) OFF: Ignition switch off	-
F WIPER VOL POS	Wiper volume position / 10s or 15s or 20s	Condition value can be displayed	-

OK:
The normal conditions listed above are displayed.

NG → **REPLACE WINDSHIELD WIPER SWITCH ASSEMBLY**

OK

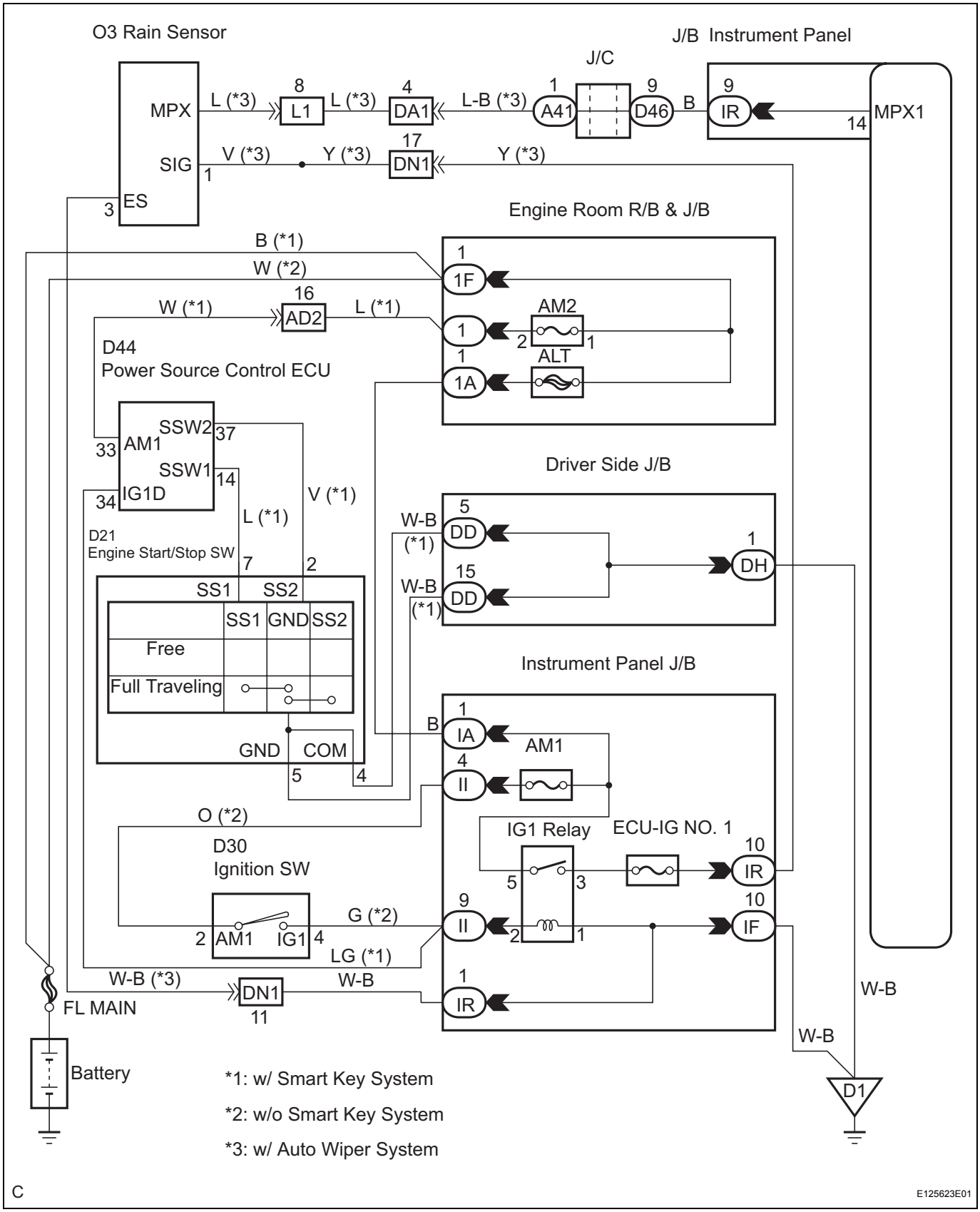
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

Rain Sensor Circuit

DESCRIPTION

This circuit provides power to operate the rain sensor.
The auto wiper system operates when the wiper switch is in the AUTO position.
The rain sensor is connected to each ECU at the multiplex communication circuit.
When it detects raindrops in the detection area of the windshield glass, the rain sensor sends a wiper control signal to the front controller according to the amount of raindrops detected.
It also sends signals to the adaptive laser radar cruise control system, the mirror defogger system and others.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Before performing this procedure, check that DTCs for the multiplex communication system are output (See page MP-23).

1	READ VALUE OF INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on (IG) and turn the intelligent tester main switch on.
(c) Select the items below in the DATA LIST, and read the displays on the intelligent tester.

RAIN SENSOR:

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
WIPER SW LO SIG	Front wiper switch LO signal / ON or OFF	ON: Front wiper switch in LO position OFF: Front wiper switch in a position except LO	-
WIPER SW HI SIG	Front wiper switch HI signal / ON or OFF	ON: Front wiper switch in HI position OFF: Front wiper switch in a position except HI	-
WIPER SW AUTO SIG	Front wiper switch AUTO signal / ON or OFF	ON: Front wiper switch in HI position OFF: Front wiper switch in a position except HI	-
WASHER SW SIG	Washer switch signal / ON or OFF	ON: Washer switch ON OFF: Washer switch OFF	-
F WIPER HI SW	Front wiper HI switch / ON or OFF	ON: Front wiper switch in HI position OFF: Front wiper switch in a position except HI	-
F WIPER LO SW	Front wiper LO switch / ON or OFF	ON: Front wiper switch in LO position OFF: Front wiper switch in a position except LO	-

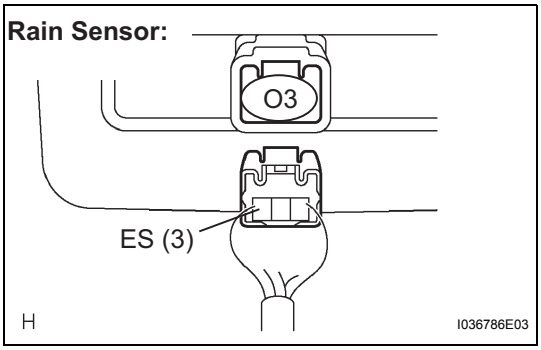
OK:
The normal conditions listed above are displayed.

NG → **Go to step 2**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

2	CHECK HARNESS AND CONNECTOR (RAIN SENSOR - BODY GROUND)



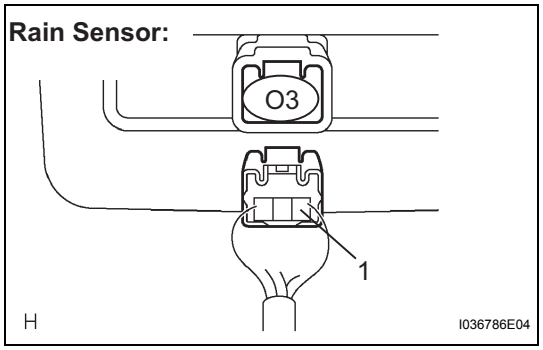
(a) Disconnect the connector from the rain sensor.
(b) Measure the resistance according to the value(s) in the table below.
Resistance

Tester Connection	Condition	Specified Condition
O3-3 - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	CHECK HARNESS AND CONNECTOR (IGNITION SWITCH CIRCUIT)



(a) Disconnect the connector from the rain sensor.
(b) Measure the voltage according to the value(s) in the table below.

Voltage

Tester Connection	Condition	Specified Condition
O3-1 - Body ground	Ignition switch off	Below 1 V
O3-1 - Body ground	Ignition switch on (IG)	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

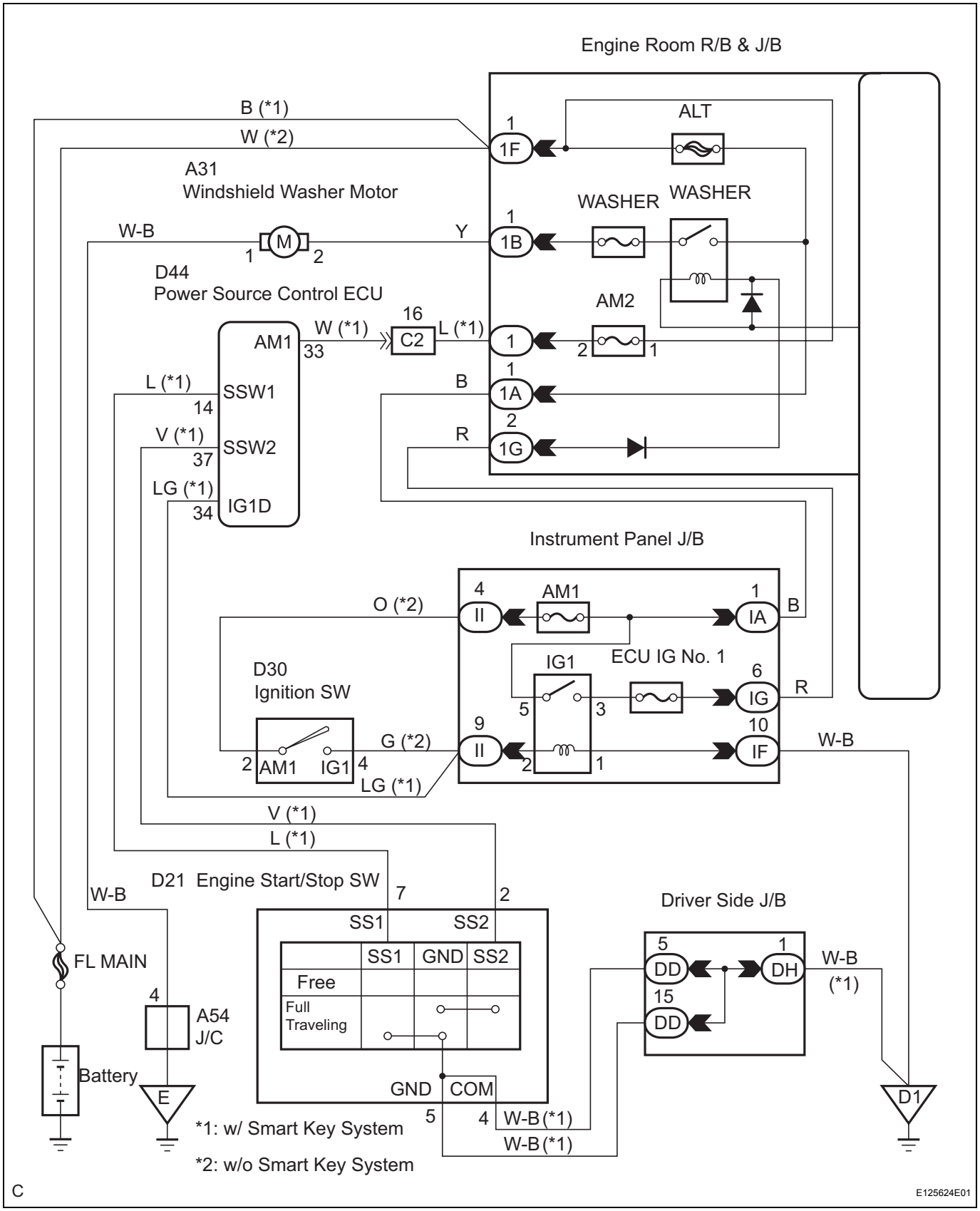
WW

Washer Motor Circuit

DESCRIPTION

The front controller receives washer switch information from the windshield wiper switch, and operates the washer relay.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	PERFORM ACTIVE TEST BY INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on (IG) and turn the intelligent tester main switch on.
(c) Select the item below in the ACTIVE TEST and then check that the washer motor operates.

BODY NO.5 (FRONT CONTROLLER):

Item	Test Details	Diagnostic Note
WASHER MOTOR	Washer motor operation OFF / ON	-

OK:
Washer motor operates.

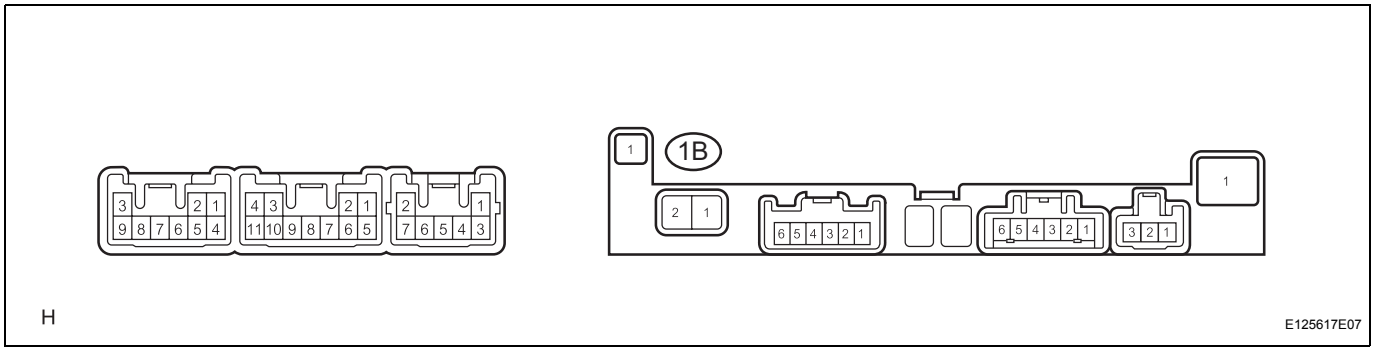
NG → **Go to step 2**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

2	INSPECT ENGINE ROOM JUNCTION BLOCK ASSEMBLY (FRONT CONTROLLER)

(a) Measure the voltage according to the value(s) in the table below.



Voltage

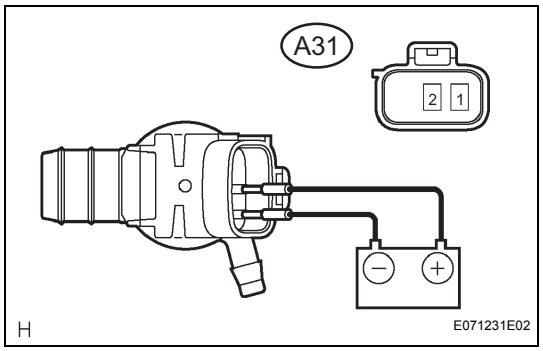
Tester Connection	Condition	Specified Condition
1B-1 - Body ground	Washer switch OFF	Below 1 V
1B-1 - Body ground	Ignition switch on (IG) and washer switch on	10 to 14 V

NG → **Go to step 4**

OK

3	INSPECT WINDSHIELD WASHER MOTOR AND PUMP ASSEMBLY

(a) Disconnect the washer motor connector.



(b) Connect the positive battery (+) lead to terminal 1 of the washer motor, and the negative battery (-) lead to terminal 2.

OK:

Washer motor operates.

NG → **REPLACE WINDSHIELD WASHER MOTOR AND PUMP ASSEMBLY**

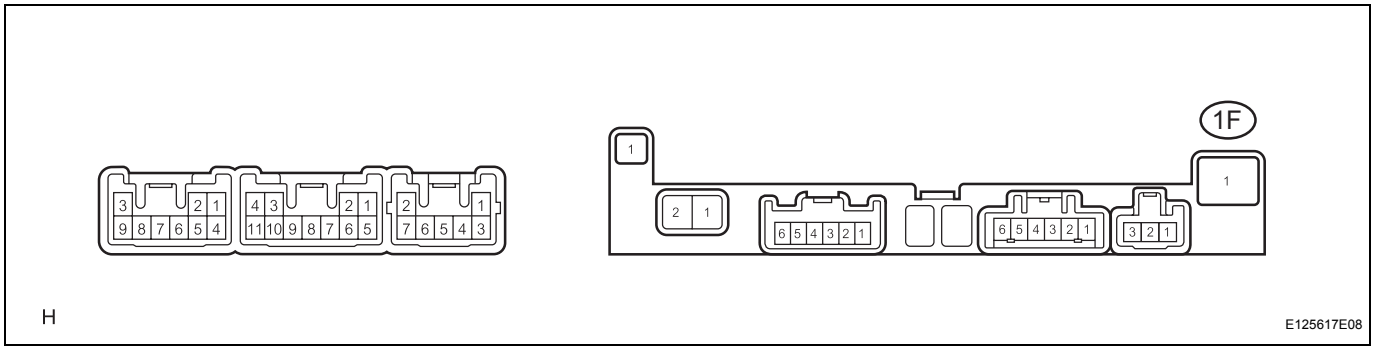
OK

REPAIR OR REPLACE HARNESS OR CONNECTOR (WASHER MOTOR CIRCUIT)

WW

4	CHECK HARNESS AND CONNECTOR (BATTERY - FRONT CONTROLLER)

(a) Measure the voltage according to the value(s) in the table below.



Voltage

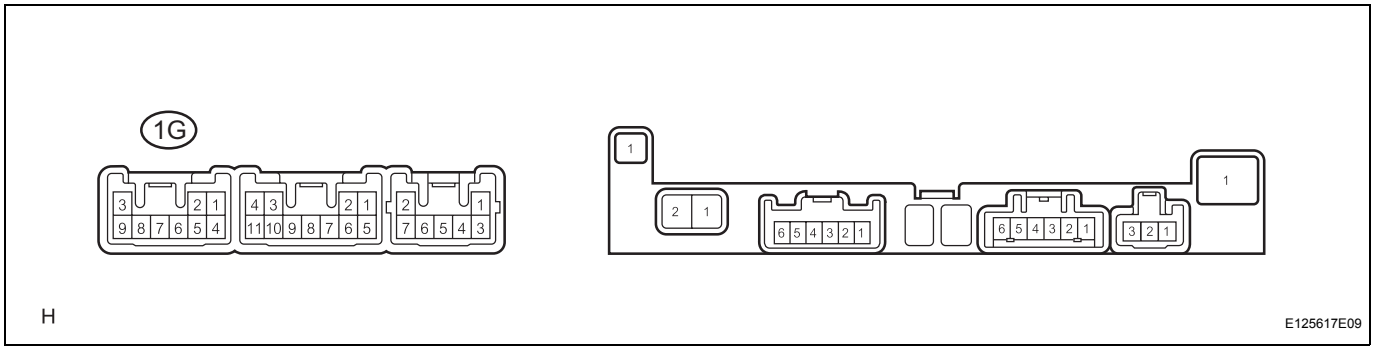
Tester Connection	Condition	Specified Condition
1F-1 - Body ground	Always	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5	CHECK HARNESS AND CONNECTOR (IGNITION SWITCH CIRCUIT)

(a) Disconnect the 1G connector from the front controller.



(b) Measure the voltage according to the value(s) in the table below:

Voltage

Tester Connection	Condition	Specified Condition
1G-2 - Body ground	Ignition switch off	Below 1 V
1G-2 - Body ground	Ignition switch on (IG)	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

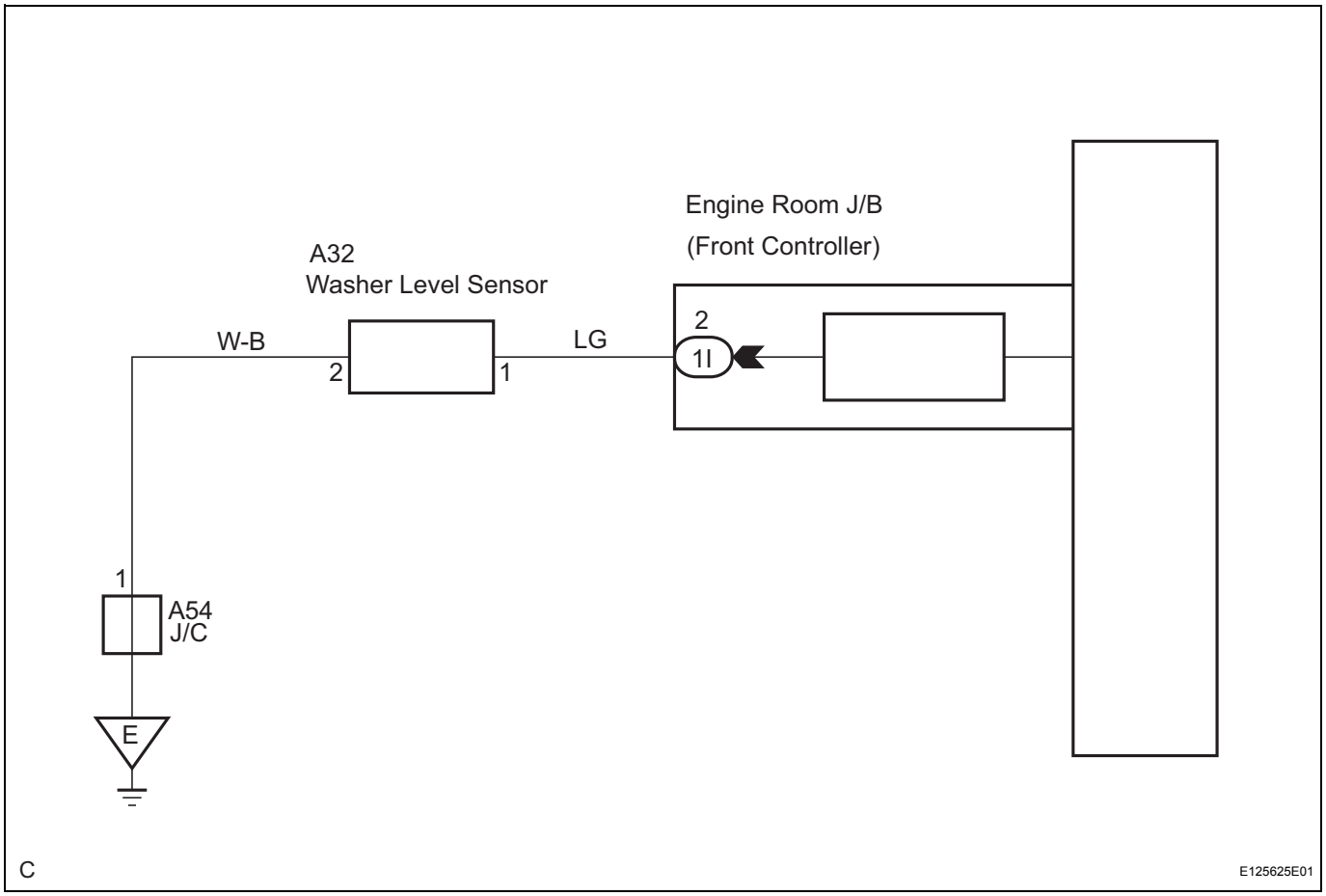
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

Washer Fluid Level Warning Switch Circuit

DESCRIPTION

The front controller receives washer fluid level sensor information, and sends it through the multiplex communication system to the combination meter. The combination meter receives this information and illuminates the washer fluid level warning light when the washer fluid falls below a predetermined level or is empty.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	READ VALUE OF INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on (IG) and turn the intelligent tester main switch on.
(c) Select the item below in the DATA LIST, and read the displays on the intelligent tester.

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
WASHER LVL SW	Washer level switch / ON or OFF	ON: Washer jar is empty OFF: Washer jar is full	-

OK:

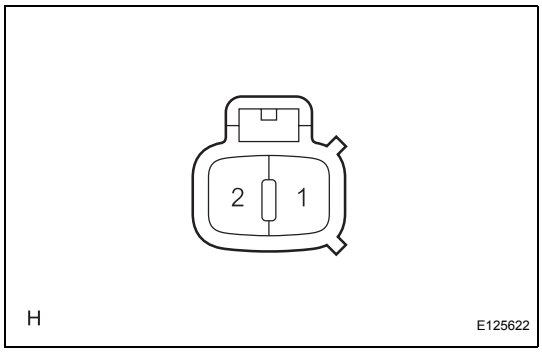
The normal conditions listed above are displayed.

NG → Go to step 2

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

2 INSPECT LEVEL WARNING SWITCH ASSEMBLY



(a) Measure the resistance according to the value(s) in the table below.

Resistance

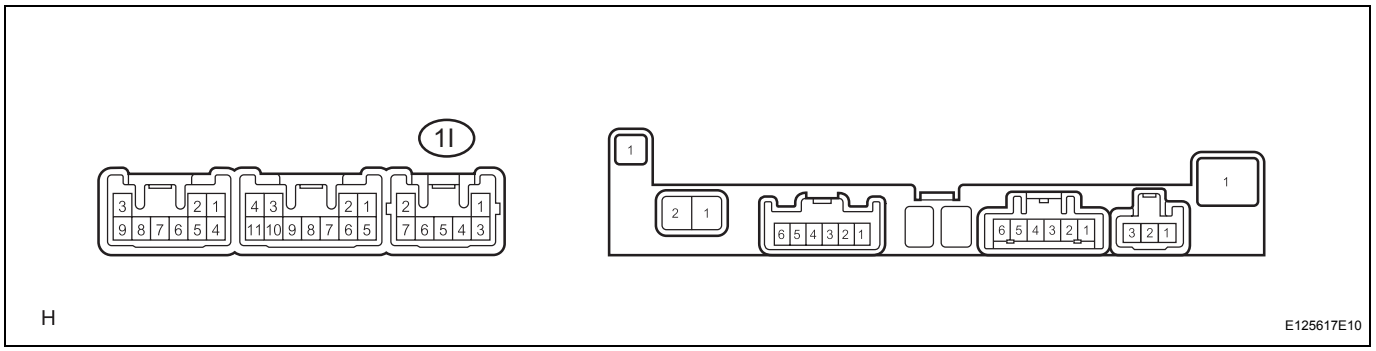
Tester Connection	Condition	Specified Condition
1 - 2	Washer jar is full	Below 1 Ω
1 - 2	washer jar is empty	10 kΩ or higher

NG → **REPLACE LEVEL WARNING SWITCH ASSEMBLY**

OK

3 CHECK HARNESS AND CONNECTOR (WASHER LEVEL SENSOR CIRCUIT)

(a) Disconnect the 1I connector from the front controller.



(b) Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Condition	Specified Condition
1I-2 - Body ground	Washer jar is full	Below 1 Ω
1I-2 - Body ground	Washer jar is empty	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

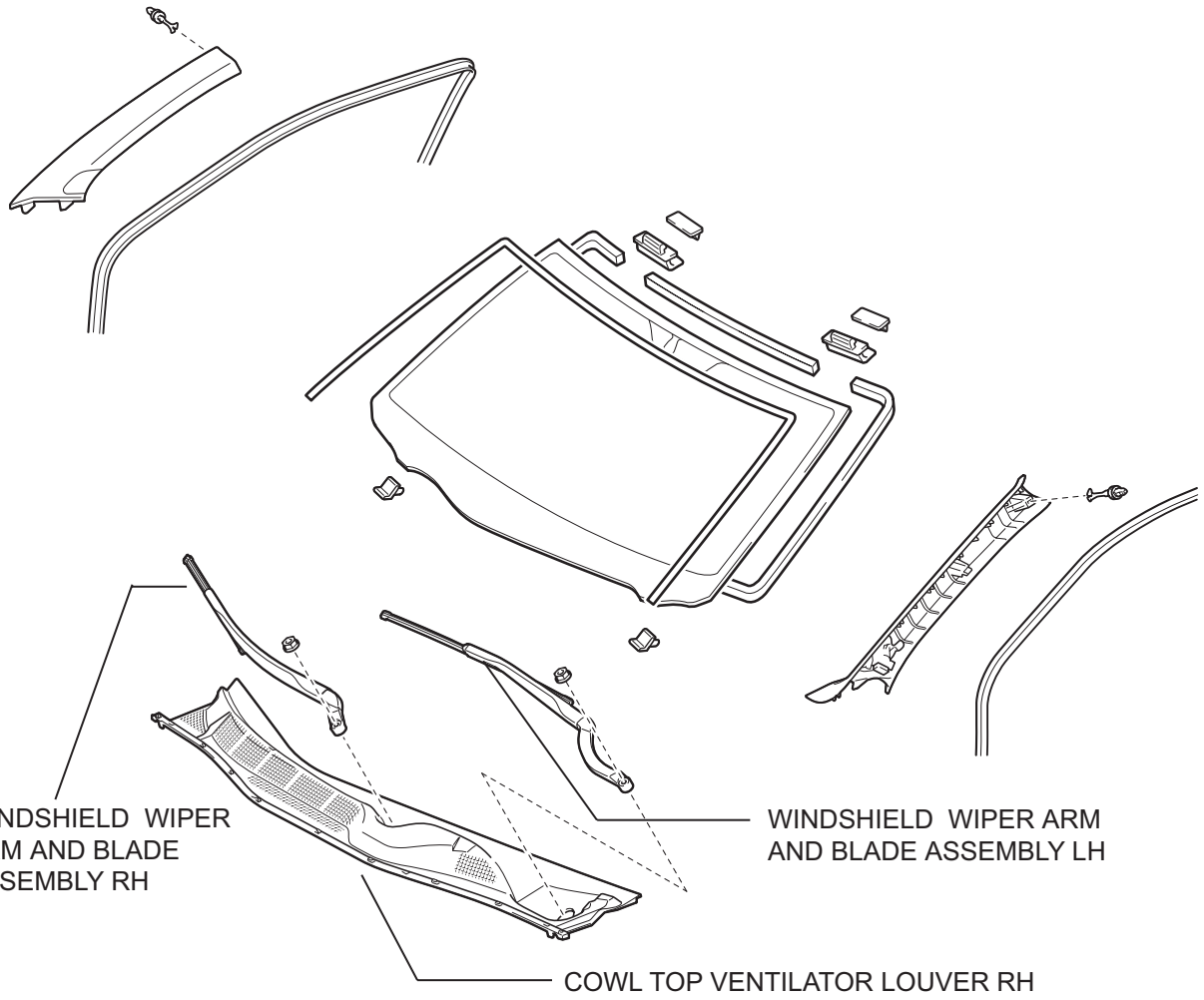
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

FRONT WIPER MOTOR

COMPONENTS

WW



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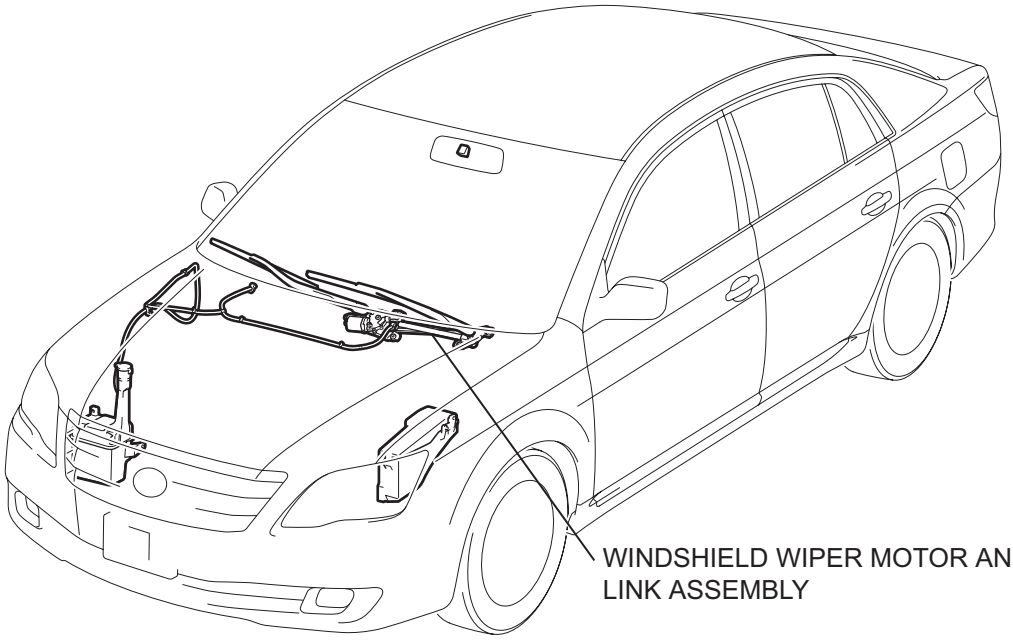
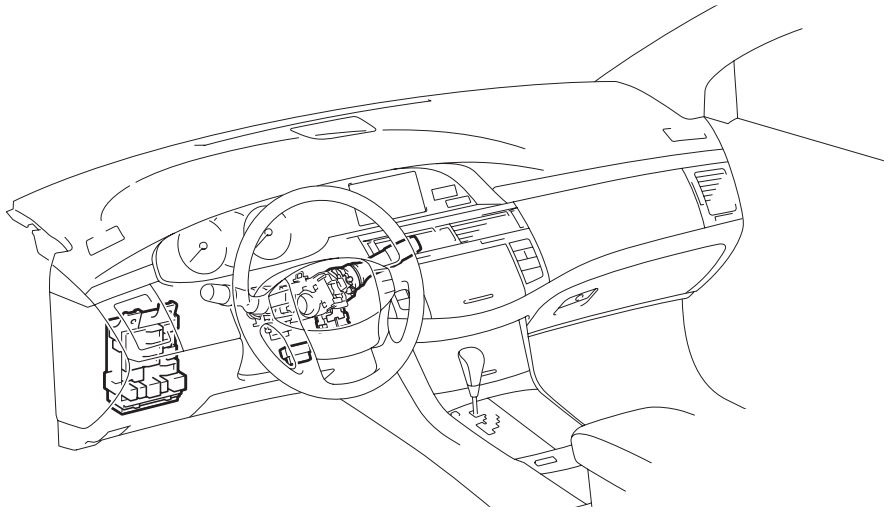


WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY

- WINDSHIELD WIPER MOTOR ASSEMBLY
- WINDSHIELD WIPER LINK ASSEMBLY



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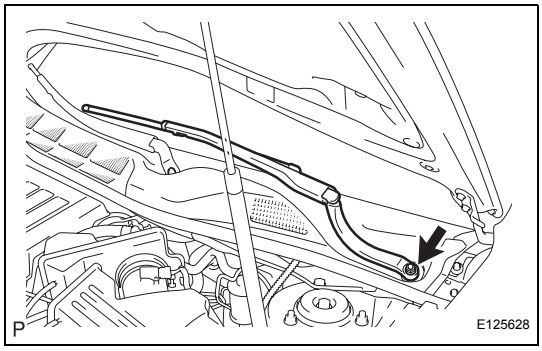
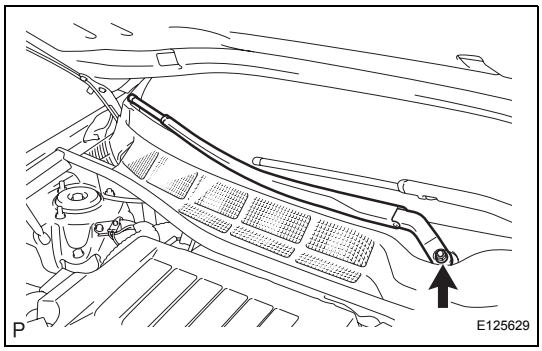
REMOVAL

HINT:
Installation is in the reverse order of removal.



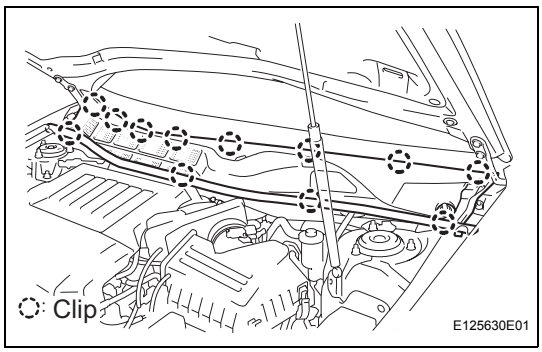
1. REMOVE WINDSHIELD WIPER ARM AND BLADE ASSEMBLY LH

(a) Remove the nut and FR wiper arm & blade assembly LH.



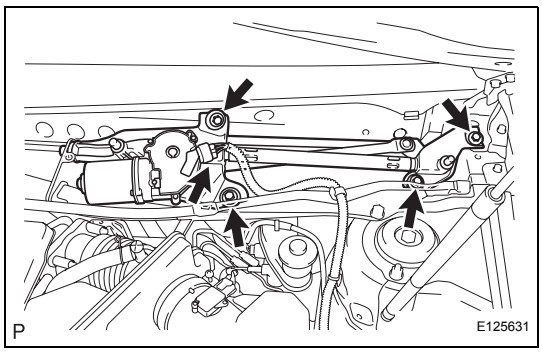
2. REMOVE WINDSHIELD WIPER ARM AND BLADE ASSEMBLY RH

(a) Remove the nut and FR wiper arm & blade assembly RH.



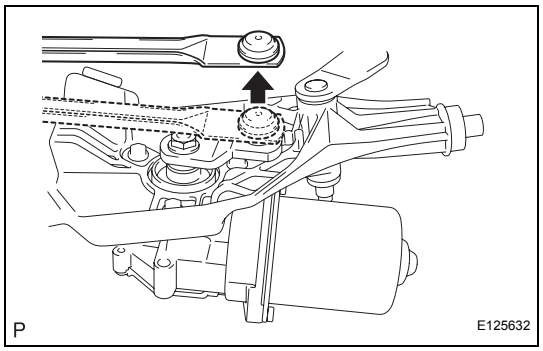
3. REMOVE COWL TOP VENTILATOR LOUVER SUB-ASSEMBLY

(a) Disengage the 12 clips, and remove the cowl top ventilator louver RH.



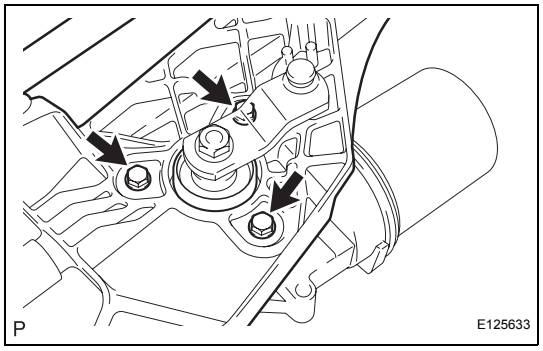
4. REMOVE WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY

(a) Disconnect the connector.
(b) Remove the 4 bolts and windshield wiper motor & link assembly.

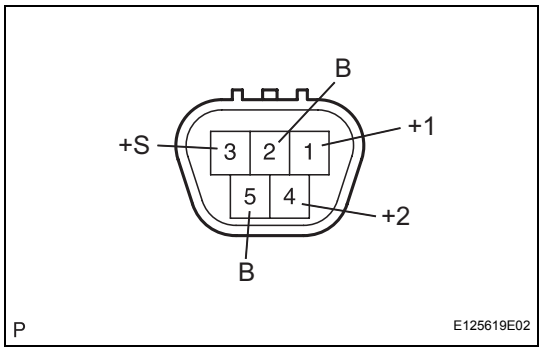


5. REMOVE WINDSHIELD WIPER LINK ASSEMBLY

(a) Using a screwdriver wrapped with protective tape, separate the rod of the wiper link assembly from the windshield wiper motor assembly as shown in the illustration.



(b) Remove the 3 bolts and wiper link assembly.



INSPECTION

1. WINDSHIELD WIPER MOTOR ASSEMBLY

(a) LO Operation Check

(1) Connect the positive battery (+) lead to terminal 1 (+1) of the connector, and the negative battery (-) lead to terminal 5 (E), and check that the motor operates at low speed (LO).

(b) HI Operation Check

(1) Connect the positive battery (+) lead to terminal 4 (+2) of the connector, and the negative battery (-) lead to terminal 5 (E), and check that the motor operates at high speed (HI).

(c) Automatic Stop Operation Check

(1) Connect the positive battery (+) lead to terminal 1 (+1) of the connector, and the negative battery (-) lead to terminal 5 (E). With the motor operating at low speed (LO), disconnect terminal 1 (+1) to stop wiper motor operation at any position other than the automatic stop position.

(2) Using SST, connect terminals 3 (+S) and 1 (+1), and the positive battery (+) lead to terminal 3 (B) to restart motor operation at low speed.

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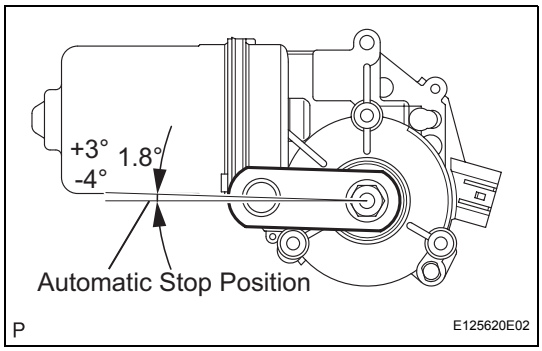
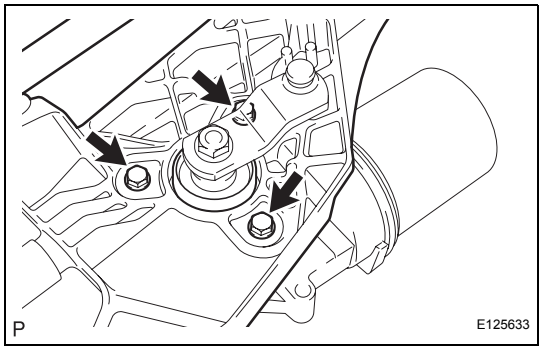


(3) Check the automatic stop position as shown in the illustration.

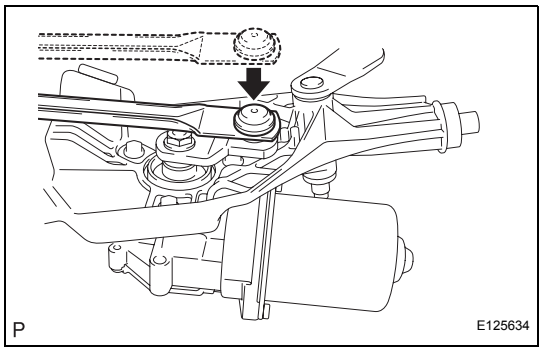
INSTALLATION

1. INSTALL WINDSHIELD WIPER LINK ASSEMBLY

(a) Install the windshield wiper motor assembly with the 3 bolts.
Torque: 7.5 N*m (76 kgf*cm, 66 in.*lbf)



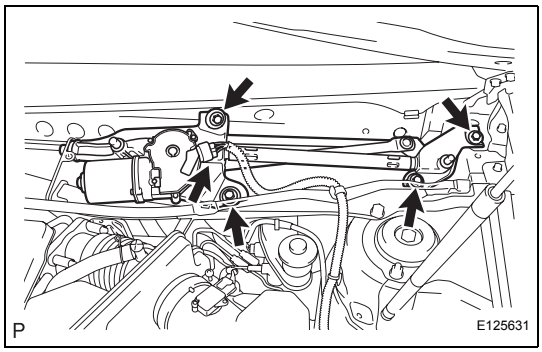
(b) Install the rod to the wiper link assembly.



2. INSTALL WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY

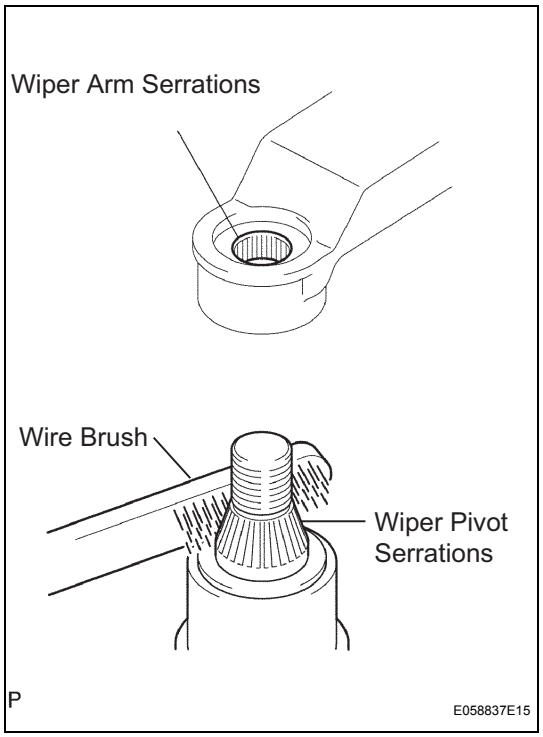
(a) Install the windshield wiper motor & link assembly with the 4 bolts.
Torque: 7.0 N*m (71 kgf*cm, 62 in.*lbf)

(b) Connect the connector.

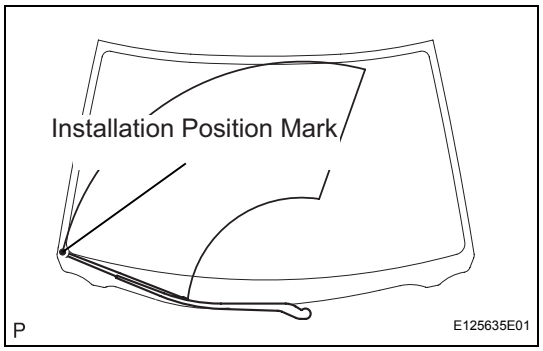


3. INSTALL WINDSHIELD WIPER ARM AND BLADE ASSEMBLY RH

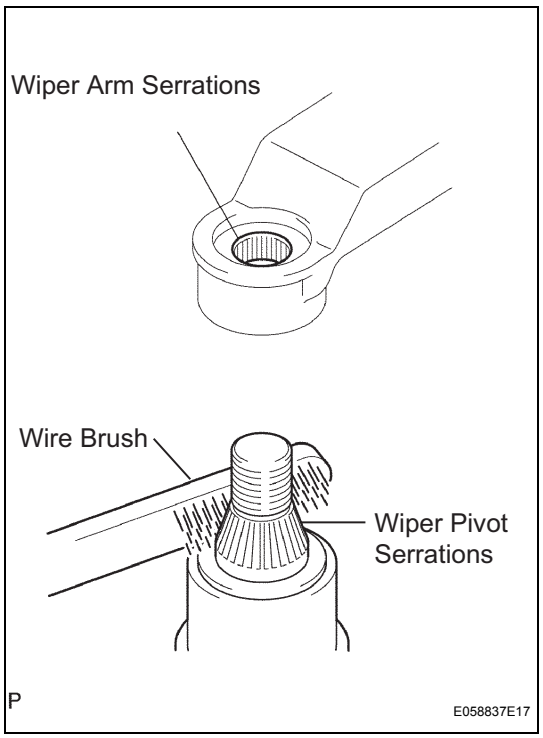
(a) Operate the wiper, and stop the windshield wiper motor assembly at the automatic stop position.



(b) Clean the wiper arm serrations.
(c) Clean the wiper pivot serrations with a wire brush (before reinstalling).



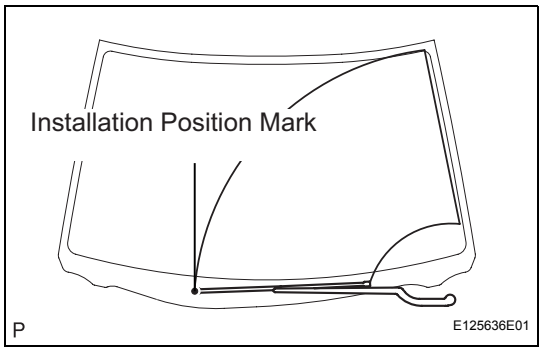
(d) Install the FR wiper arm & blade assembly RH with the nut at the position as shown in the illustration.
Torque: 20 N*m (209 kgf*cm, 15 ft.*lbf)
HINT:
Hold the arm hinge by hand to fasten the nut.



4. INSTALL WINDSHIELD WIPER ARM AND BLADE ASSEMBLY LH

(a) Clean the wiper arm serrations.
(b) Clean the wiper pivot serrations with a wire brush (when reinstalling).

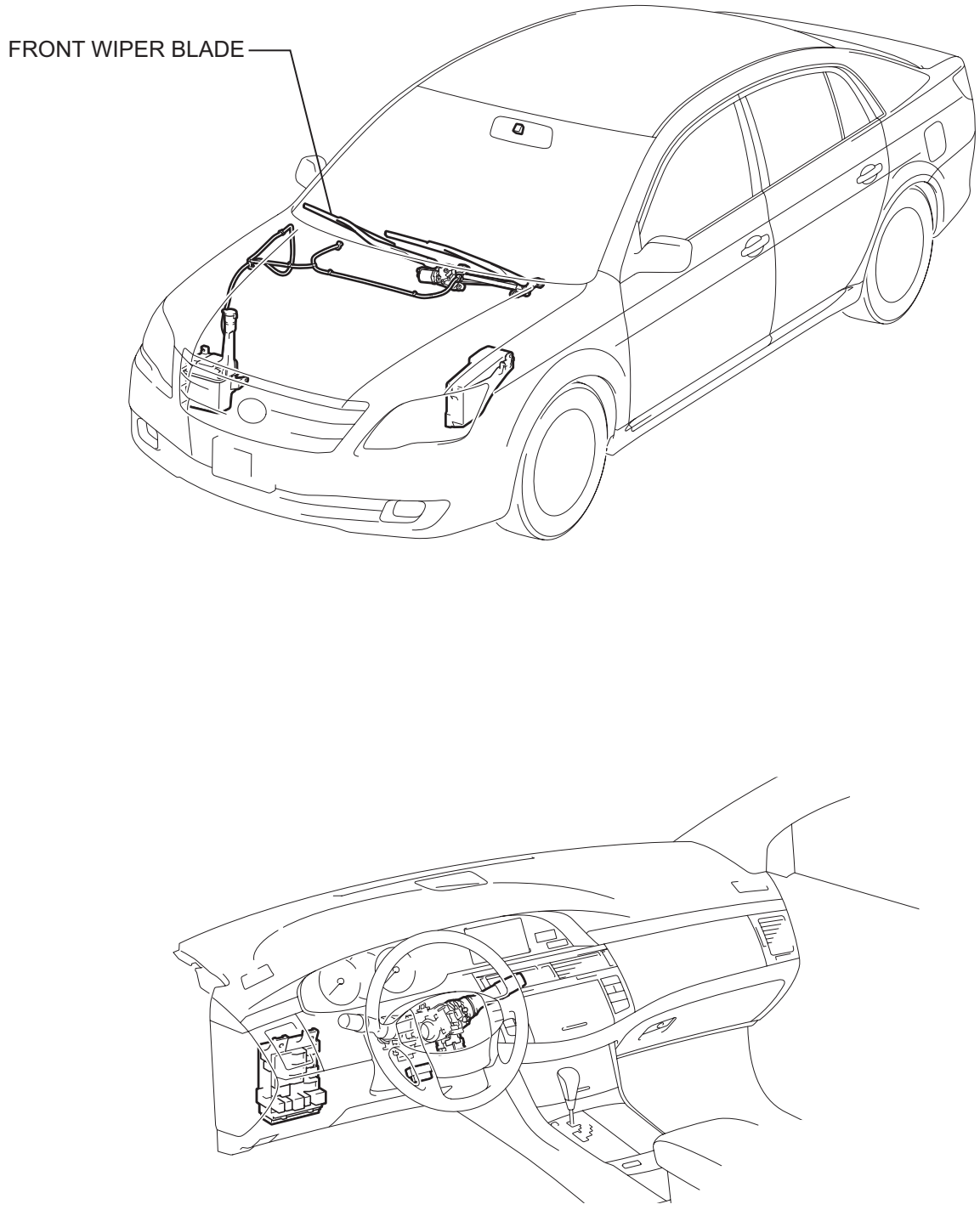
WW

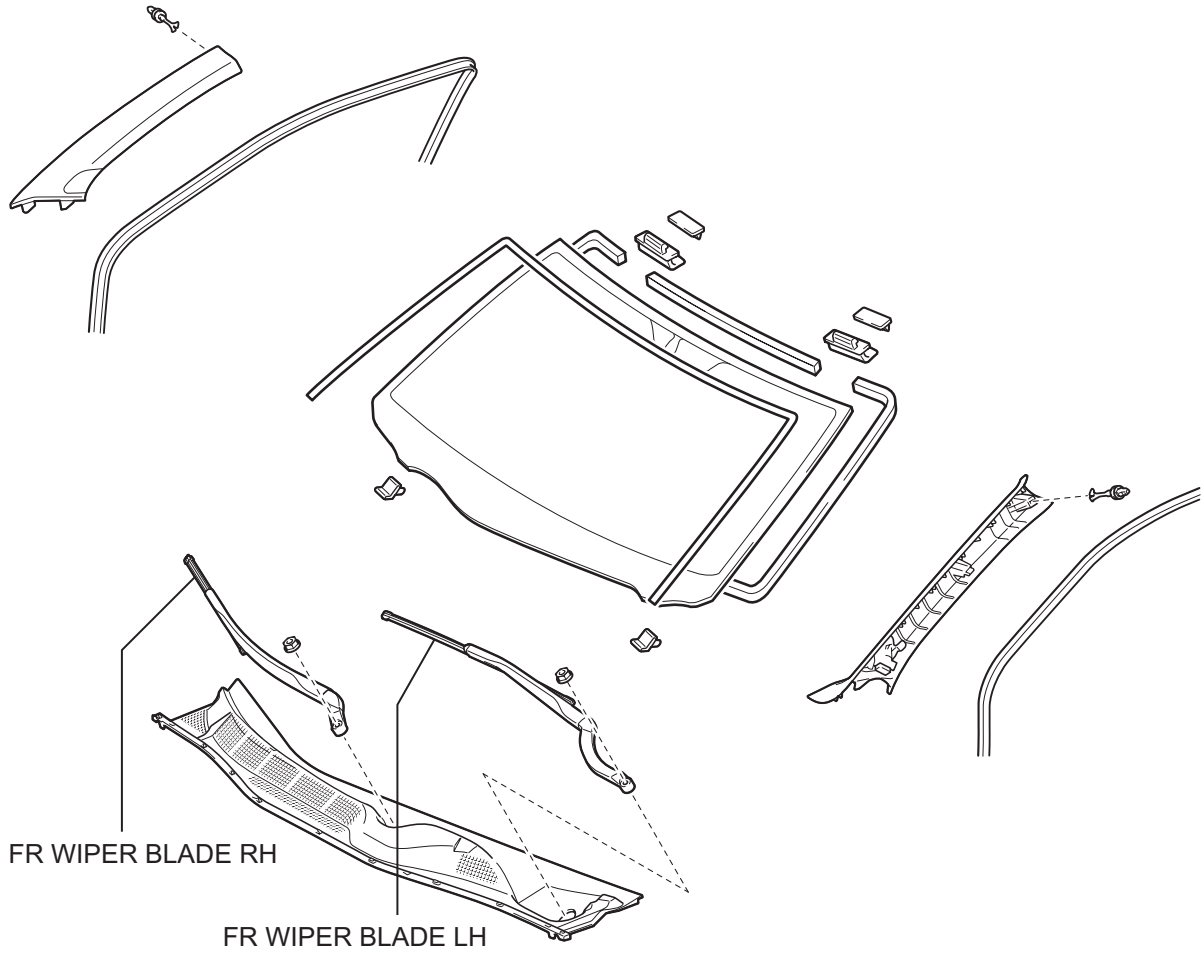


(c) Install the FR wiper arm & blade assembly LH with the nut at the position shown in the illustration.
Torque: 20 N*m (209 kgf*cm, 15 ft.*lbf)
HINT:
Hold the arm hinge by hand to fasten the nut.

FRONT WIPER RUBBER

COMPONENTS





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REMOVAL

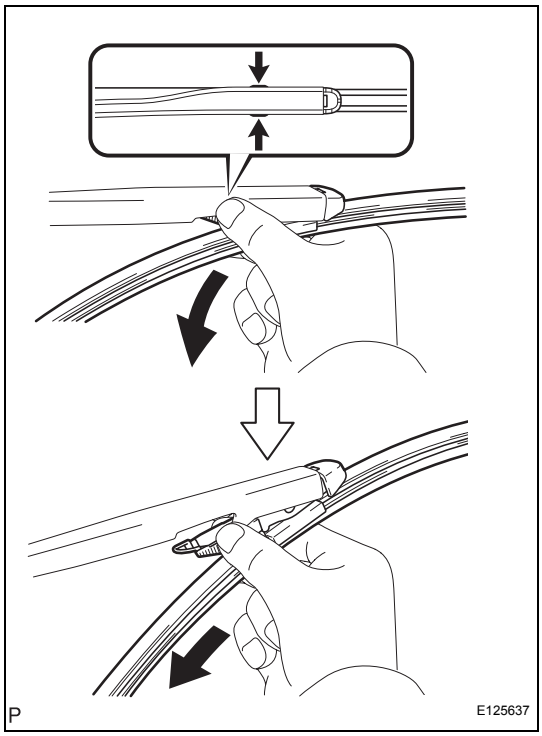
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- Installation is in the reverse order of removal.

1. REMOVE WINDSHIELD WIPER ARM AND BLADE ASSEMBLY LH (See page WW-38)

2. REMOVE FR WIPER BLADE LH

(a) Remove the FR wiper blade LH as shown in the illustration.

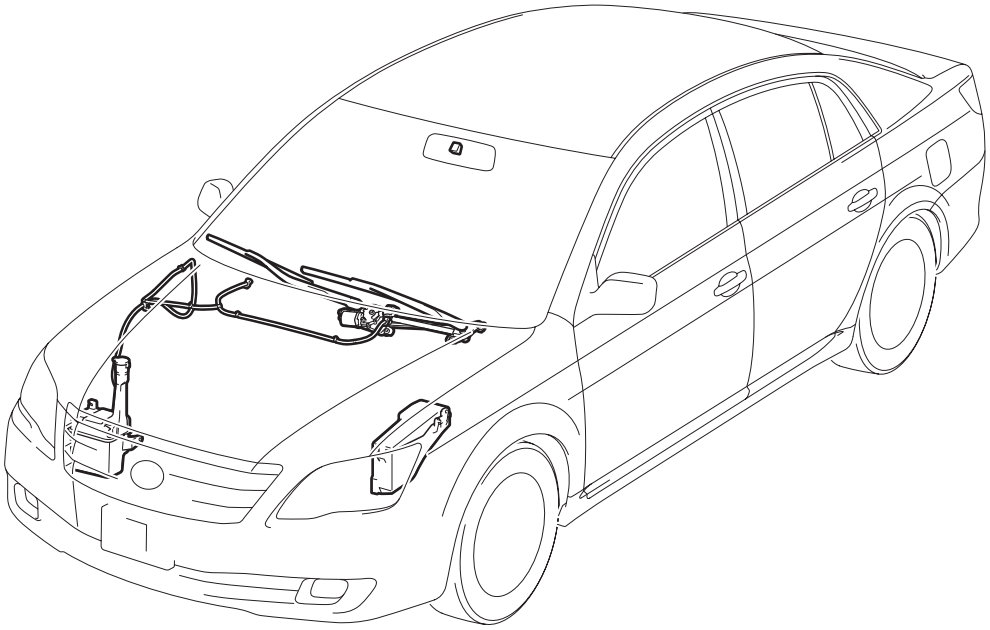


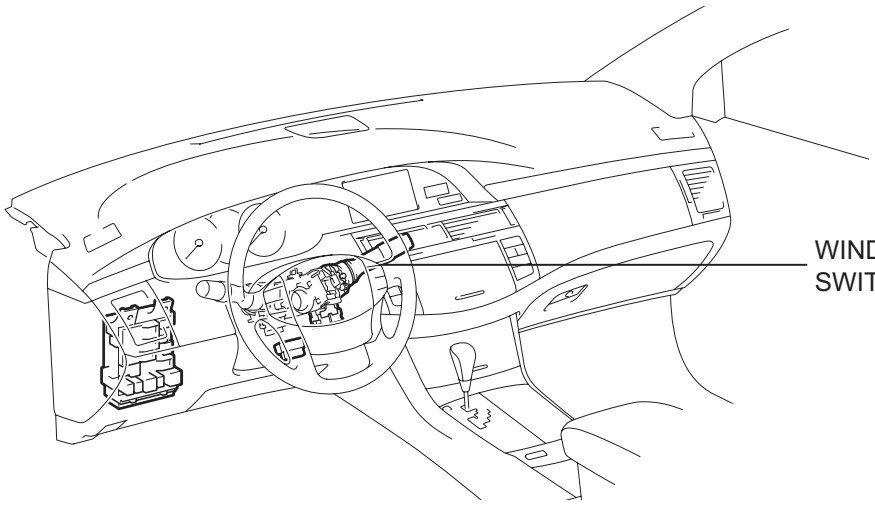
INSTALLATION

1. **INSTALL WINDSHIELD WIPER ARM AND BLADE ASSEMBLY LH (See page WW-41)**

WIPER SWITCH

COMPONENTS





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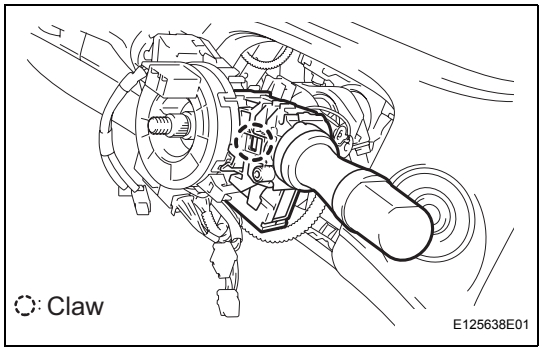
WW

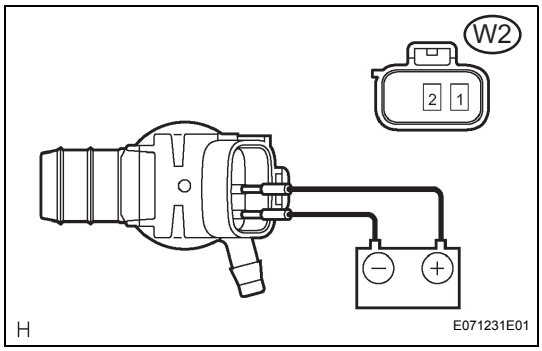
REMOVAL

1. **PRECAUTION**
   (RS-1)
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
4. **REMOVE STEERING WHEEL COVER LOWER NO.3 (See page RS-304)**
5. **REMOVE STEERING WHEEL COVER LOWER NO.2 (See page RS-304)**
6. **REMOVE HORN BUTTON ASSEMBLY (See page RS-304)**
7. **REMOVE STEERING WHEEL ASSEMBLY (See page SR-36)**
8. **REMOVE STEERING COLUMN COVER LWR (See page SR-36)**
9. **REMOVE STEERING COLUMN COVER (See page SR-36)**
10. **REMOVE WINDSHIELD WIPER SWITCH ASSEMBLY**
    (a) Disconnect the connector.
    (b) Disengage the claw, and remove the windshield wiper switch assembly.
    NOTICE:
    If the claw is pushed with excessive force, it may be broken.



INSTALLATION

1. **INSTALL STEERING COLUMN COVER (See page SR-46)**
2. **INSTALL STEERING COLUMN COVER LWR (See page SR-46)**
3. **INSTALL STEERING WHEEL ASSEMBLY (See page SR-46)**
4. **INSPECT STEERING WHEEL CENTER POINT (See page SR-47)**
5. **INSTALL HORN BUTTON ASSEMBLY (See page RS-305)**
6. **INSTALL STEERING WHEEL COVER LOWER NO.2 (See page RS-305)**
7. **REMOVE STEERING WHEEL COVER LOWER NO.3 (See page RS-305)**
8. **CONNECT BATTERY NEGATIVE TERMINAL**
9. **INSPECT HORN BUTTON ASSEMBLY**
10. **PERFORM INITIALIZATION** (IN-29)
11. **INSPECT SRS WARNING LIGHT** (RS-28)



FRONT WASHER MOTOR

ON-VEHICLE INSPECTION

1. INSPECT WINDSHIELD WASHER MOTOR AND PUMP ASSEMBLY

(a) Operation Check

(1) Fill the washer jar with washer fluid.

(2) Connect the positive battery (+) lead to terminal 2 of the windshield washer motor and pump assembly, and the negative battery (-) lead to terminal 1.

(3) Check that washer fluid flows from the washer jar.

WASHER NOZZLE

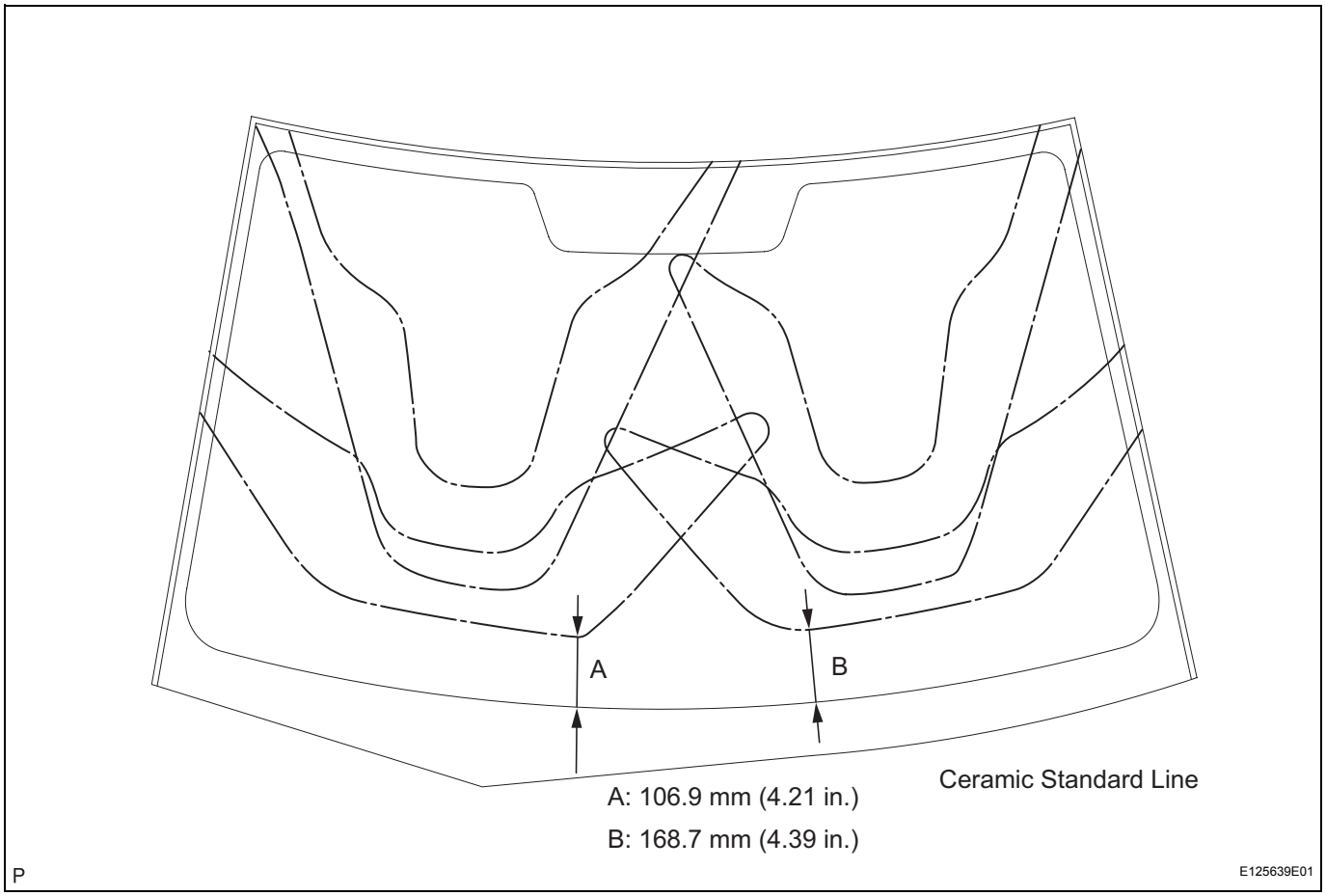
INSPECTION

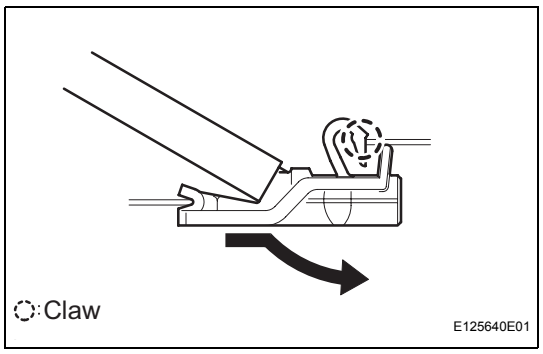
1. REMOVE WASHER NOZZLE SUB-ASSEMBLY

(a) With the engine running, check the position the washer fluid hits the windshield.

Standard:

Washer fluid hits the windshield in the areas shown in the illustration.





ADJUSTMENT

1. ADJUST WASHER NOZZLE SUB-ASSEMBLY

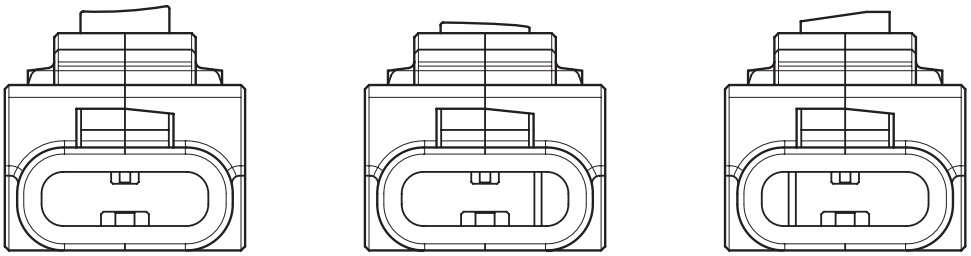
(a) Using a screwdriver, separate the washer nozzle as shown in the illustration.

NOTICE:

Be careful not to damage the glass.

(b) Select a washer nozzle so that the contact area is within the standard. Replace the nozzle with the selected one.

Available washer nozzles:



Washer fluid spray angle	0°	+1°	-1°
Part number	85380-AC010	85380-AC020	85380-AC030

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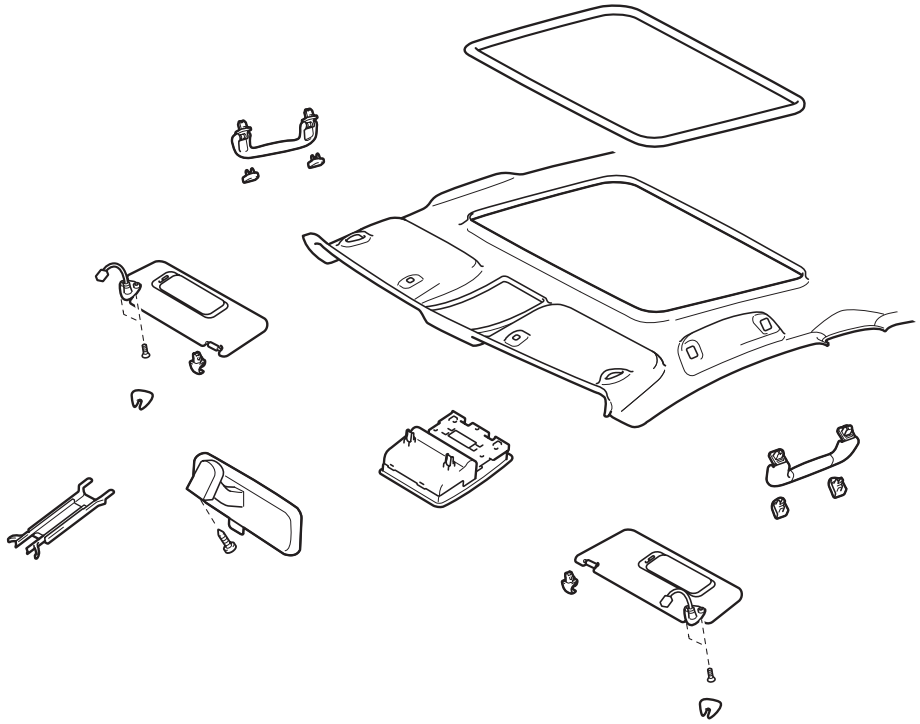
RAIN SENSOR

COMPONENTS



RAIN SENSOR

RAIN SENSOR COVER

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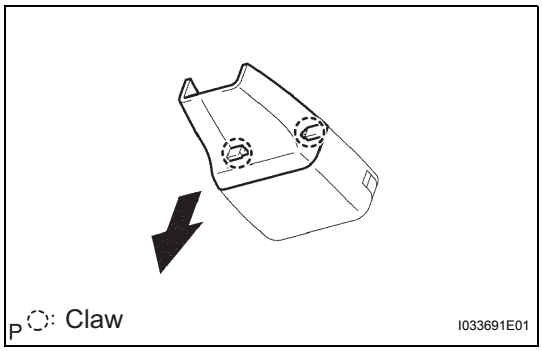
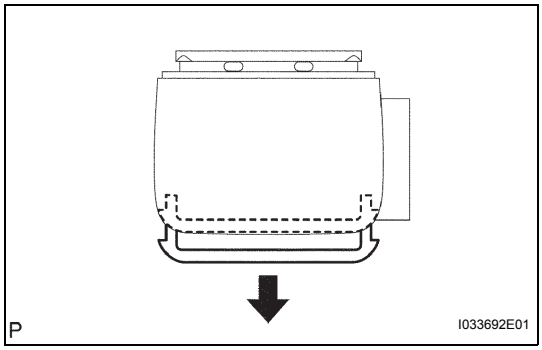


REMOVAL

1. REMOVE RAIN SENSOR COVER

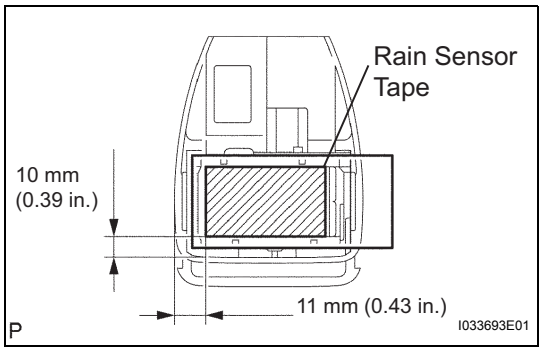
(a) Release the 2 claws and remove the rain sensor cover.



2. REMOVE RAIN SENSOR

(a) Pull out the stopper as shown in the illustration, and release the lock.

(b) Disconnect the connector and remove the rain sensor.



INSTALLATION

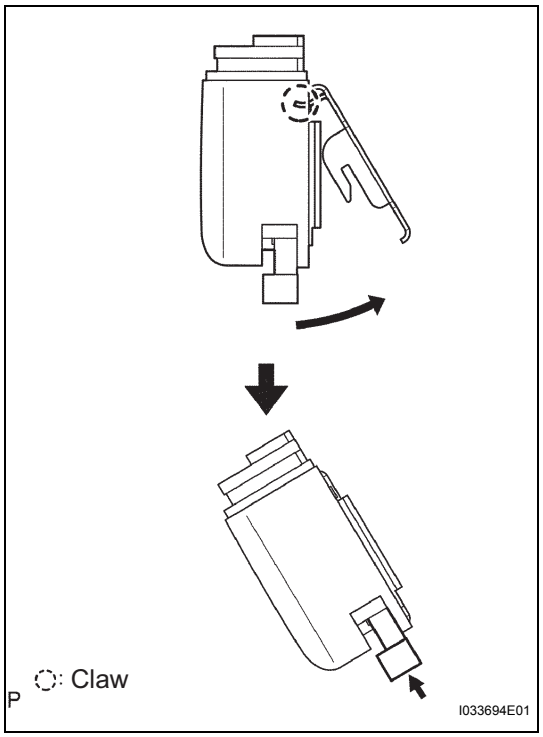
1. INSTALL RAIN SENSOR TAPE

(a) Peel off the releasing sheet (yellow side) and attach the rain sensor tape to the position indicated in the illustration (the sensor part of the rain sensor) while pushing out air bubbles with your fingers.

(b) Peel off the releasing sheet (white side).

NOTICE:

- **When reusing the rain sensor, clean dirt off the sensor part with a cloth, etc.**
- **Do not touch the adhesive surface directly with your fingers.**



2. INSTALL RAIN SENSOR

(a) Engage the claw as shown in the illustration to set the position.

(b) Gradually attach the rain sensor to the glass surface to prevent air bubbles in between.

(c) Push in the stopper.

NOTICE:

- **Check that the rain sensor tape does not remain on the wind shield glass. If it does, remove it before installing the rain sensor.**
- **Do not touch the adhesive surface and the glass surface directly with your fingers.**
- **Clean dirt on the glass with a cloth, etc.**
- **The rain sensor tape can be reused, however, replace it with a new one if it has dirt on or is damaged.**
- **After installing the rain sensor, air bubbles should not exist between the windshield glass and the rain sensor tape.**